

Figure 1. Watersheds selected for comparisons of tax map based development indicators and impervious surface estimates.

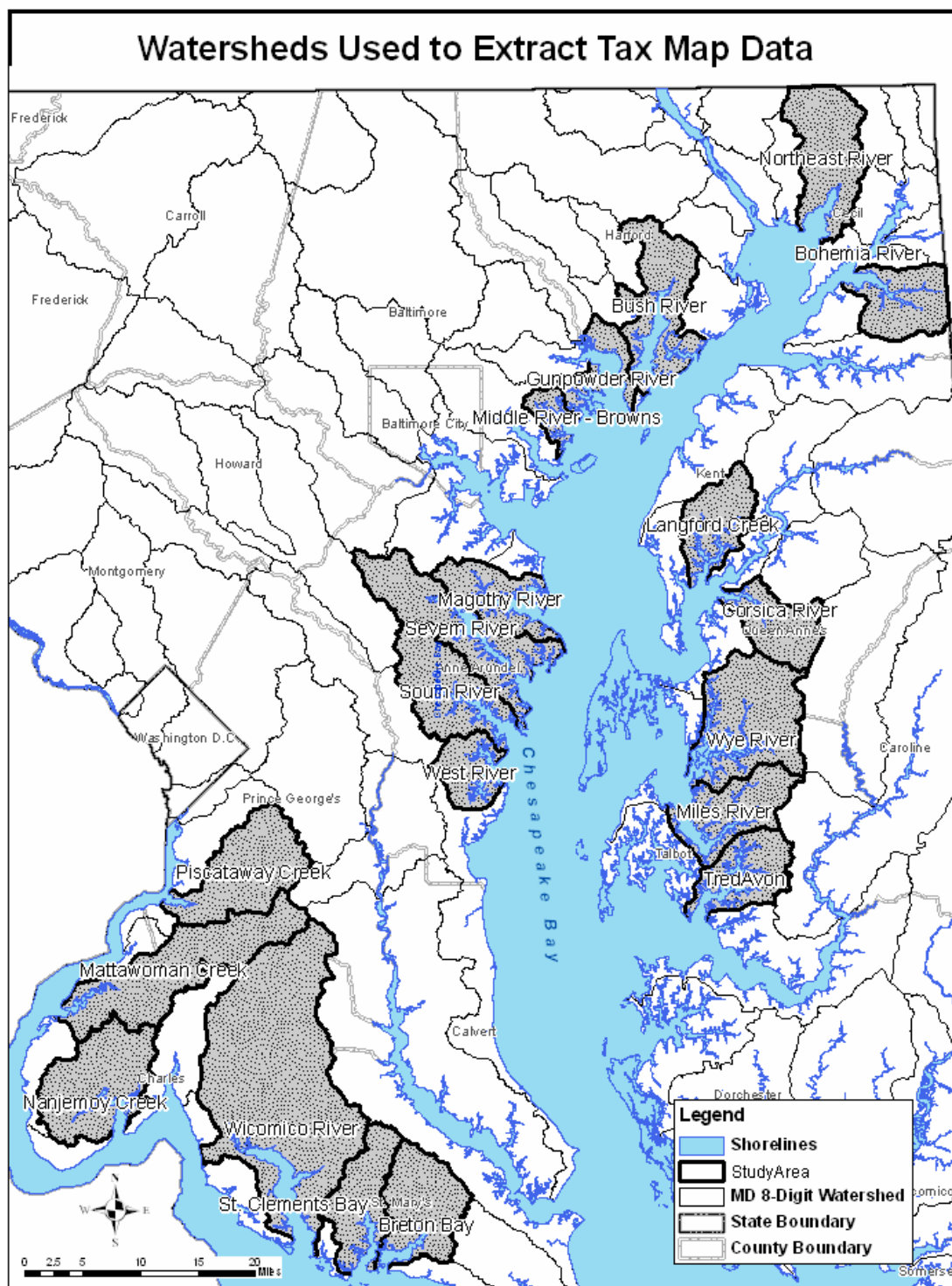


Figure 2. Relationships of percent impervious surface with (A) count of structures per watershed acre and (B) square footage of structures per watershed acre. Observed data are indicated by open symbols and lines represent predictions from a non-linear power function.

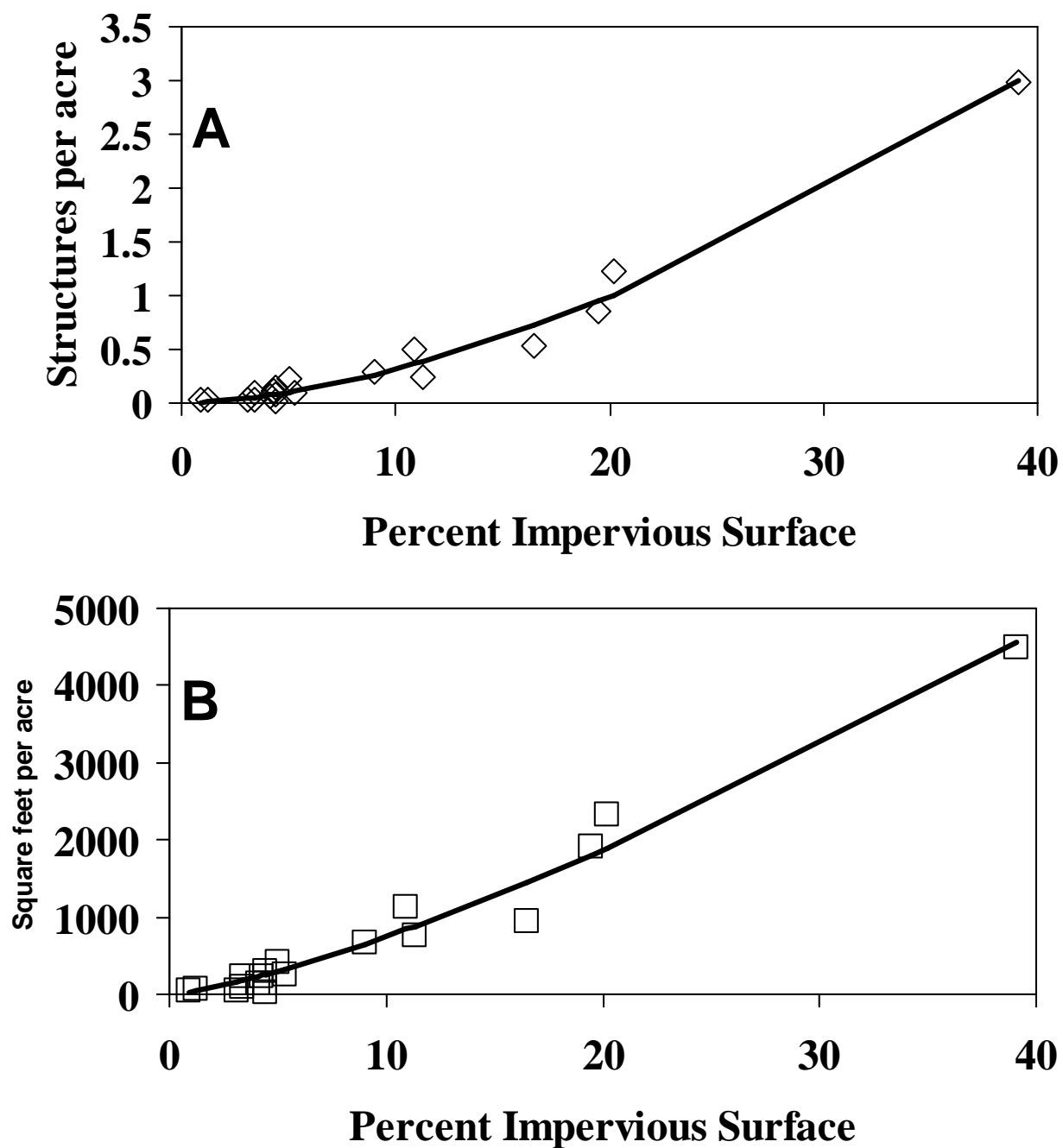


Figure 3. Watersheds sampled for stream spawning anadromous fish eggs and larvae in 2009.

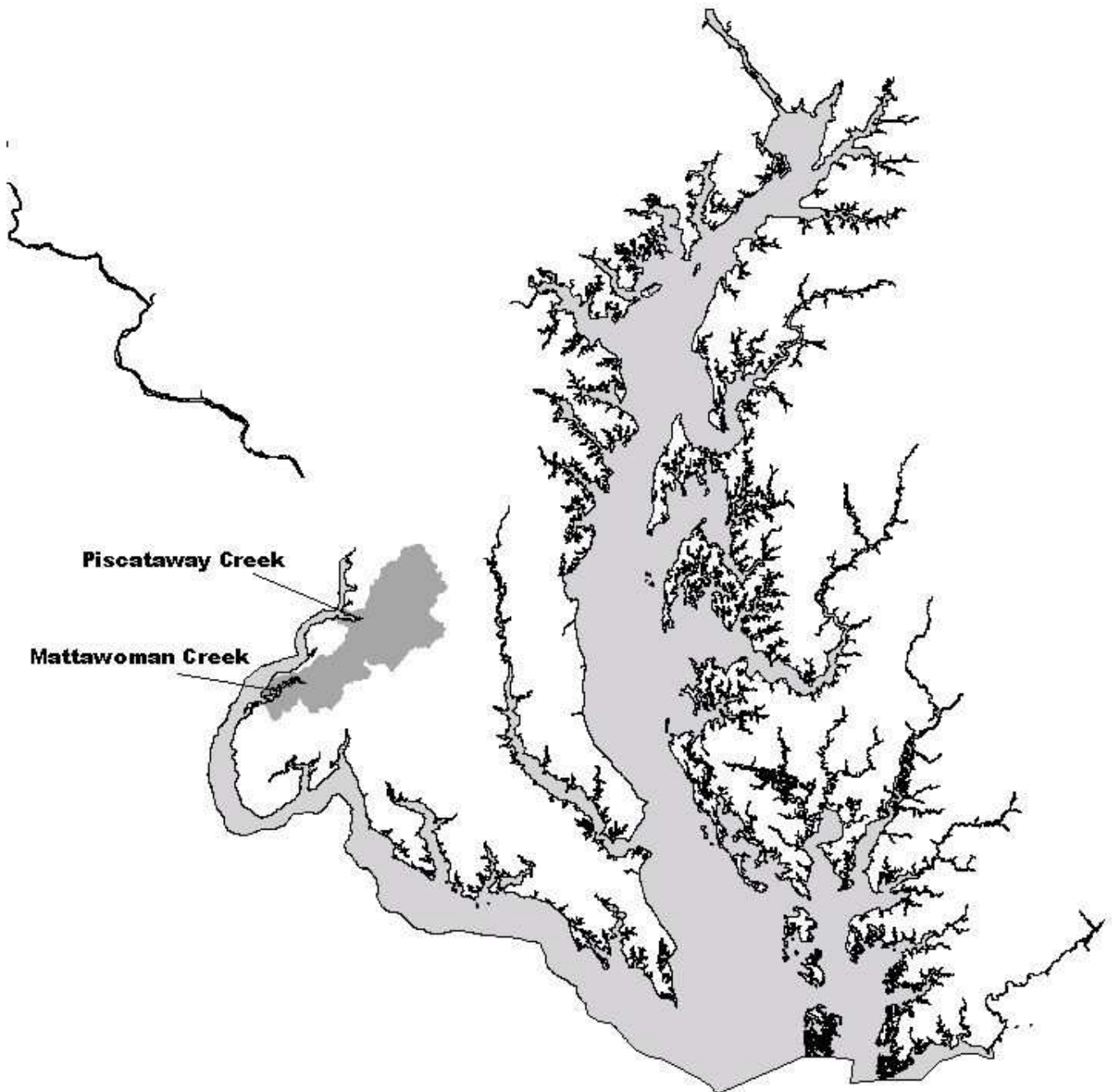


Figure 4. Mattawoman Creek historic and 2008-2009 sampling stations.

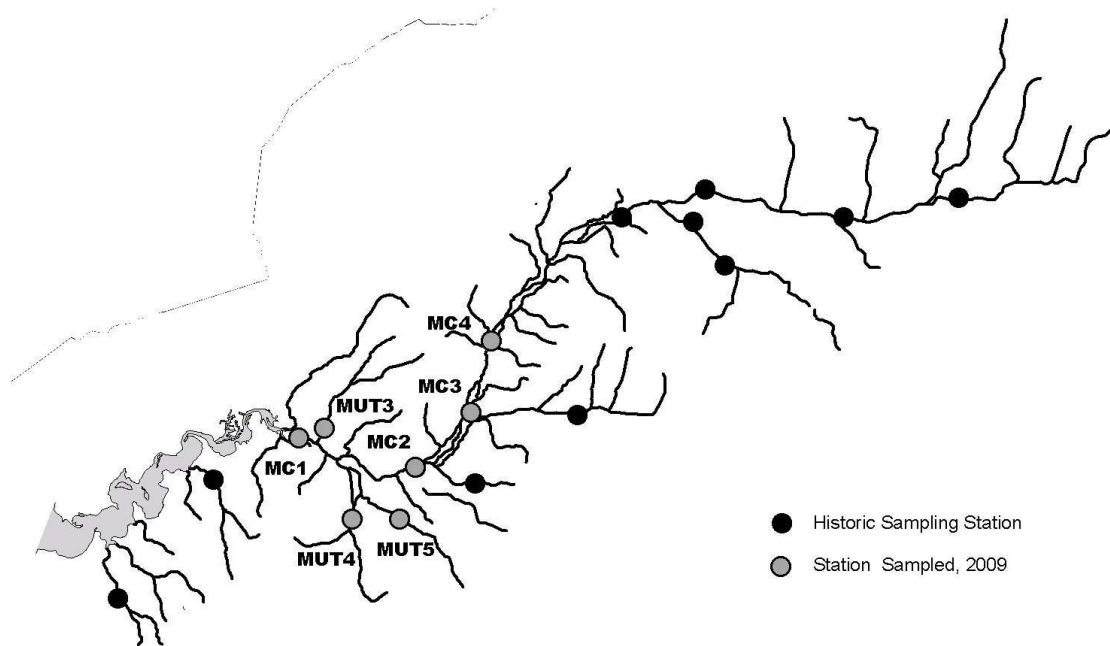


Figure 5. Piscataway Creek historic and 2008-2009 sampling stations.

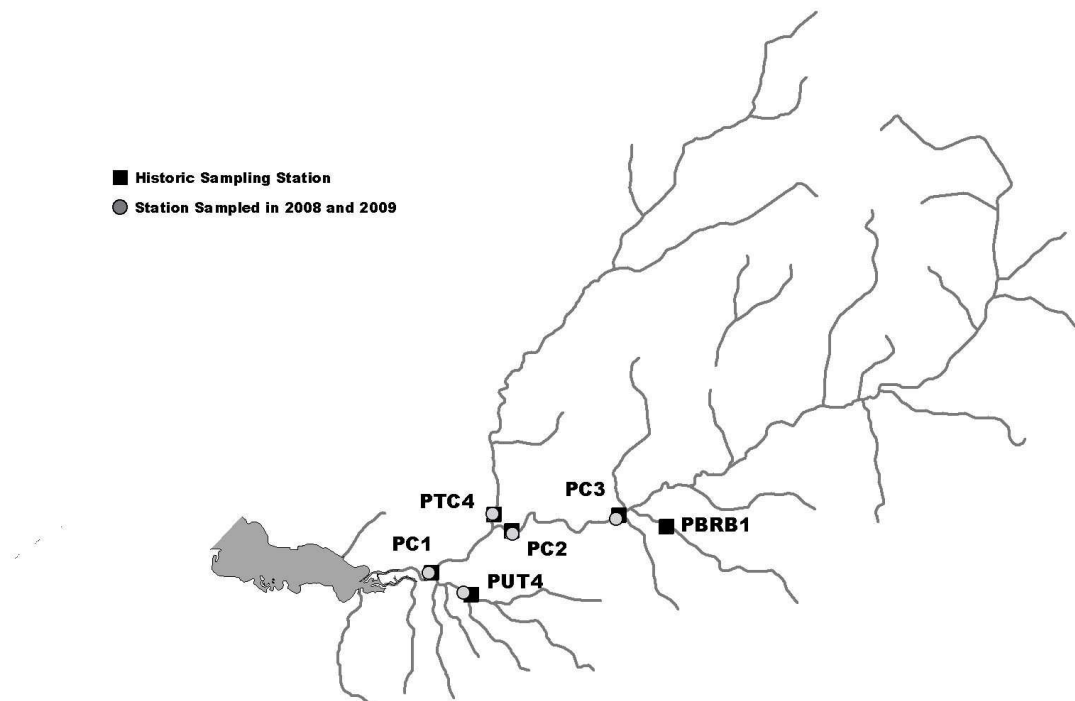


Figure 6. Mattawoman Creek stations with conductivity measurements used in analysis.

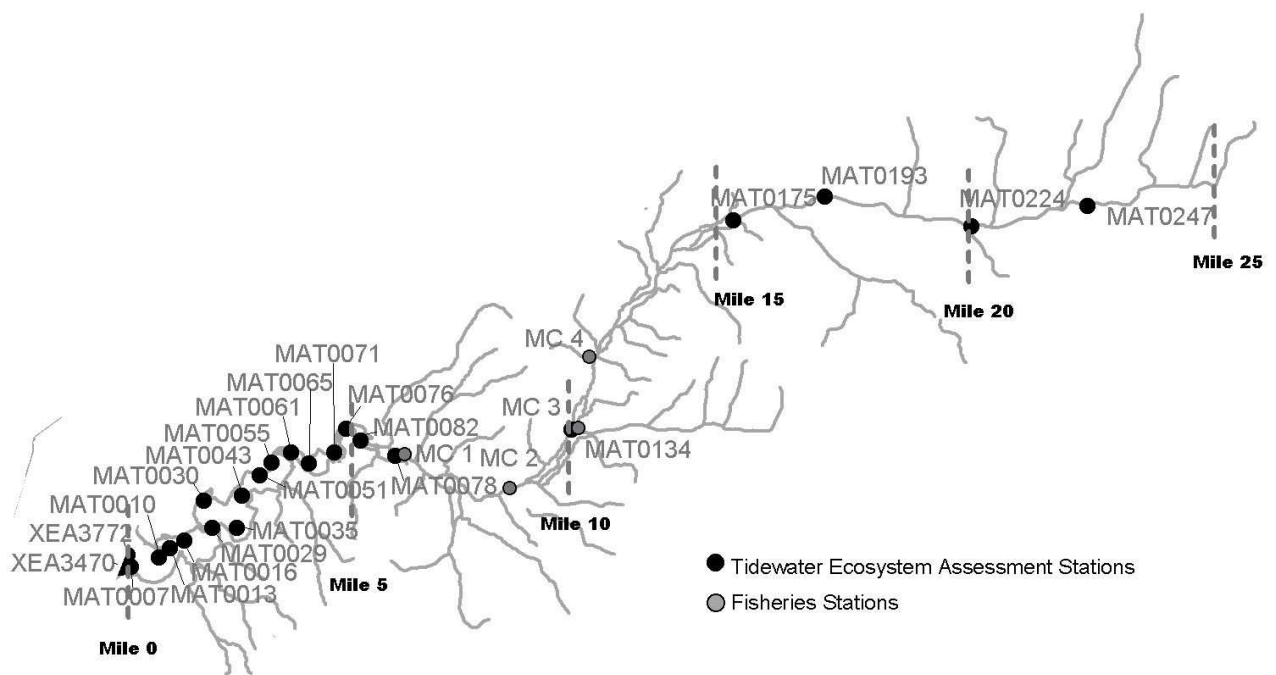


Figure 7. Conductivity during the 2008 anadromous fish stream spawning survey in Mattawoman Creek for mainstem stations (open symbols) and tributaries. Lines represent the minimum and maximum conductivities reported at MC2 and MC4 during March and April, 1991 (Hall et al. 1992). Stations labeled as MCx are mainstem stations, while stations labeled as MUTx are unnamed tributaries.

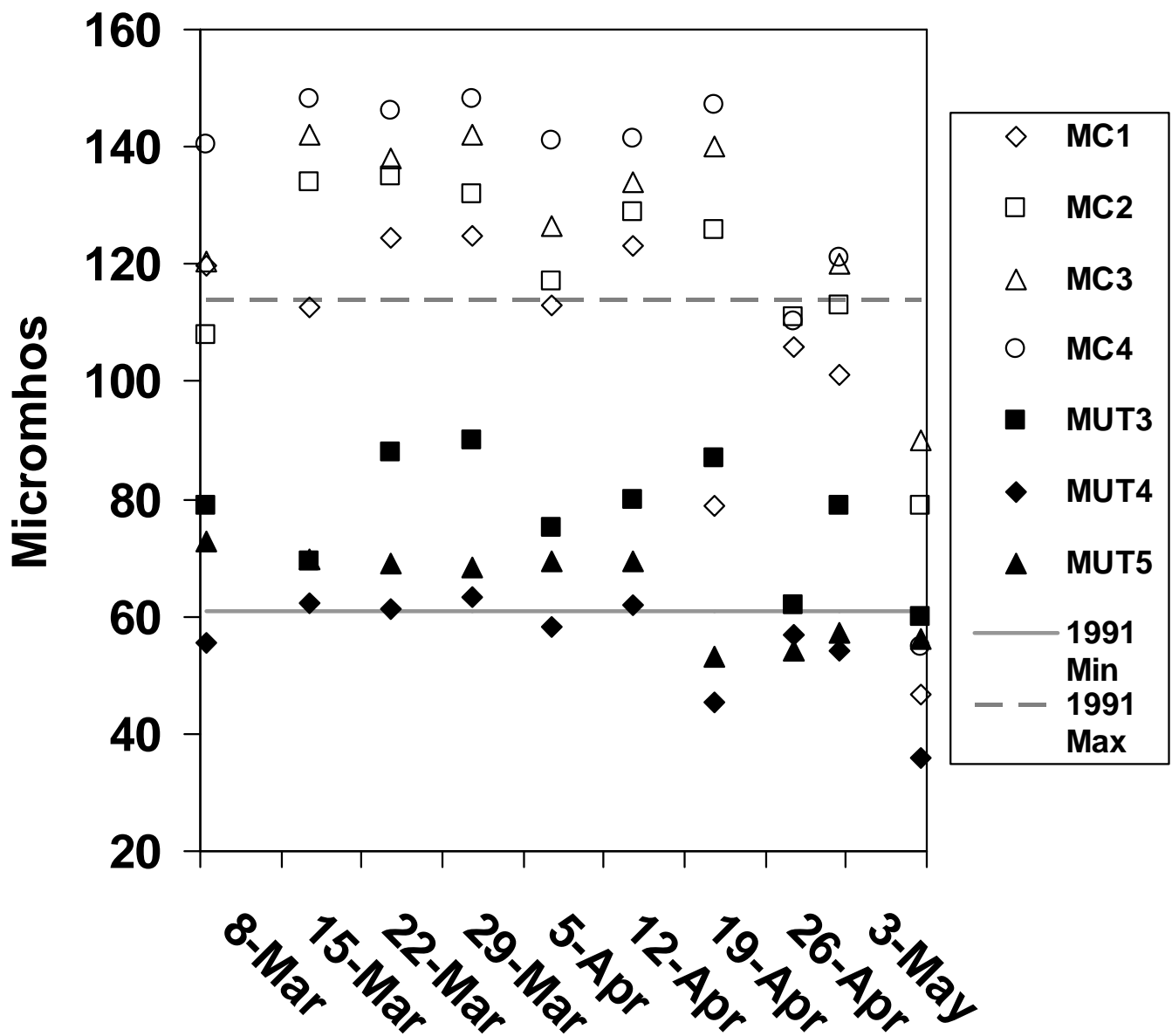


Figure 8. Conductivity during the 2009 anadromous fish stream spawning survey in Mattawoman Creek for mainstem stations (open symbols) and tributaies. Lines represent the minimum and maximum conductivities reported at MC2 and MC4 during March and April, 1991 (Hall et al. 1992). Stations labeled as MCx are mainstem stations, while stations labeled as MUTx are unnamed tributaries.

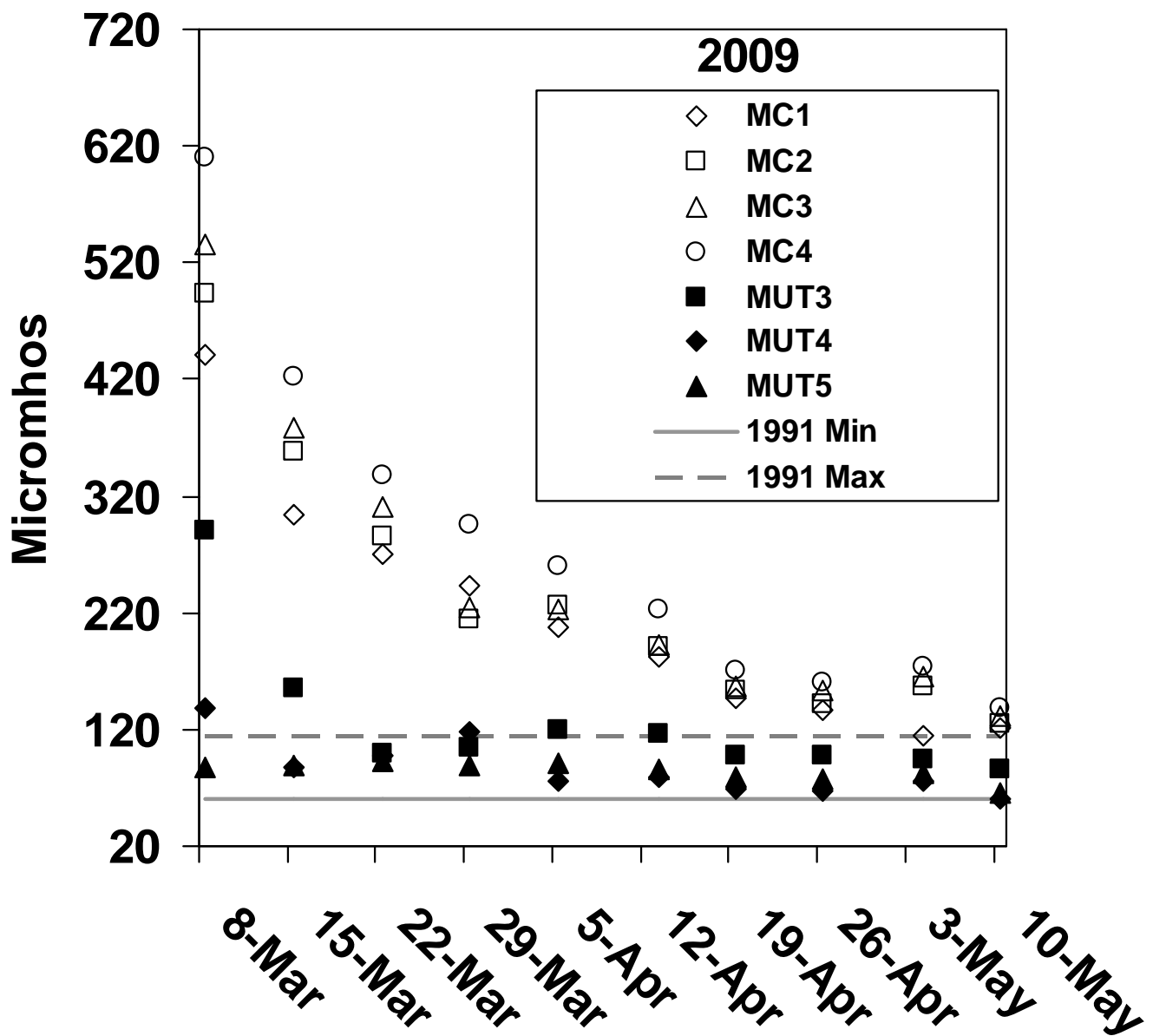


Figure 9. Conductivity during the 2008 anadromous fish stream spawning survey in Piscataway Creek for mainstem stations (open symbols) and tributaries. Stations PCx and PTC are mainstem stations, while PUT4 is a tributary.

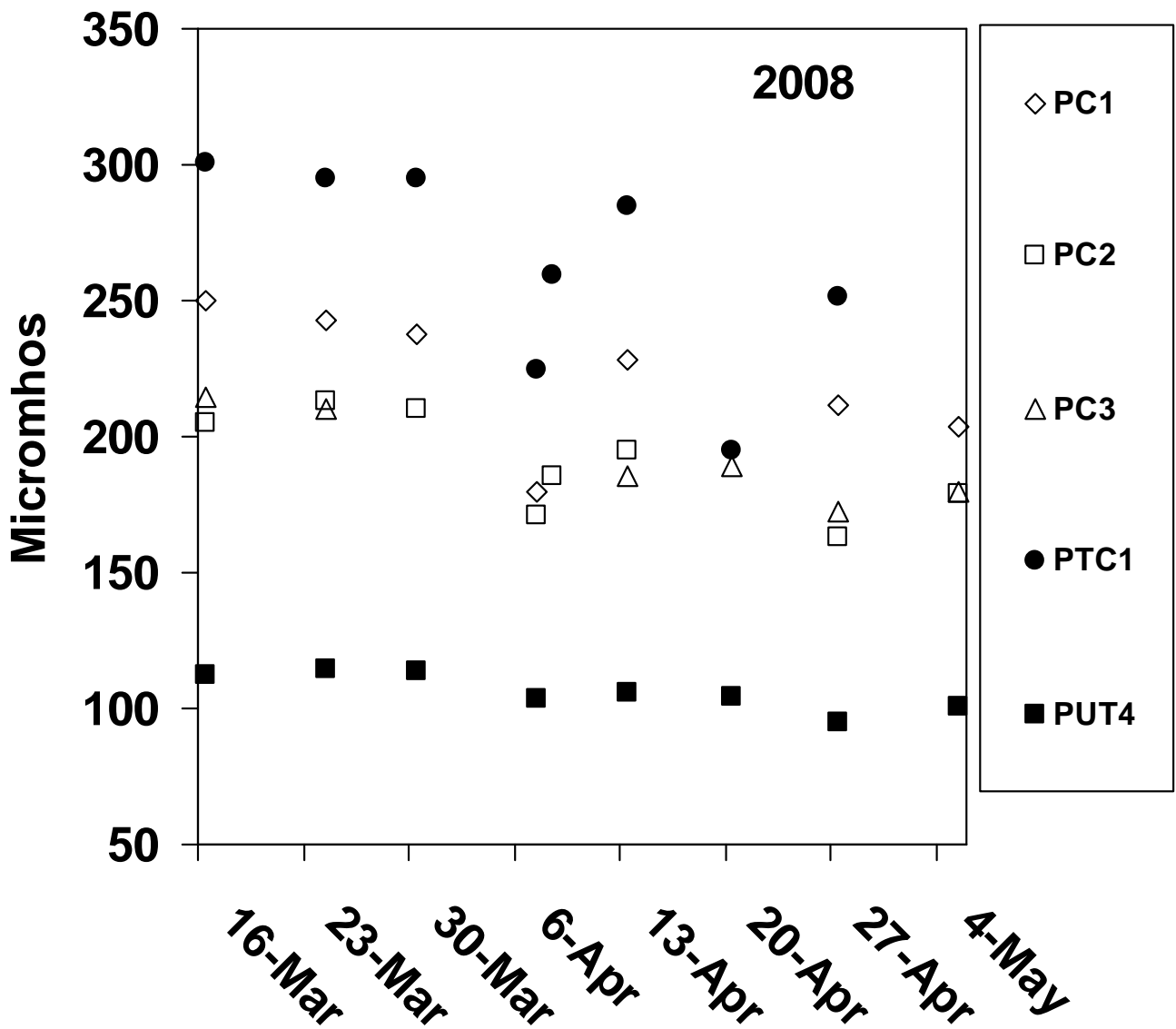


Figure 10. Conductivity during the 2009 anadromous fish stream spawning survey in Piscataway Creek for mainstem stations (open symbols) and tributaries. Stations PCx and PTC are mainstem stations, while PUT4 is a tributary.

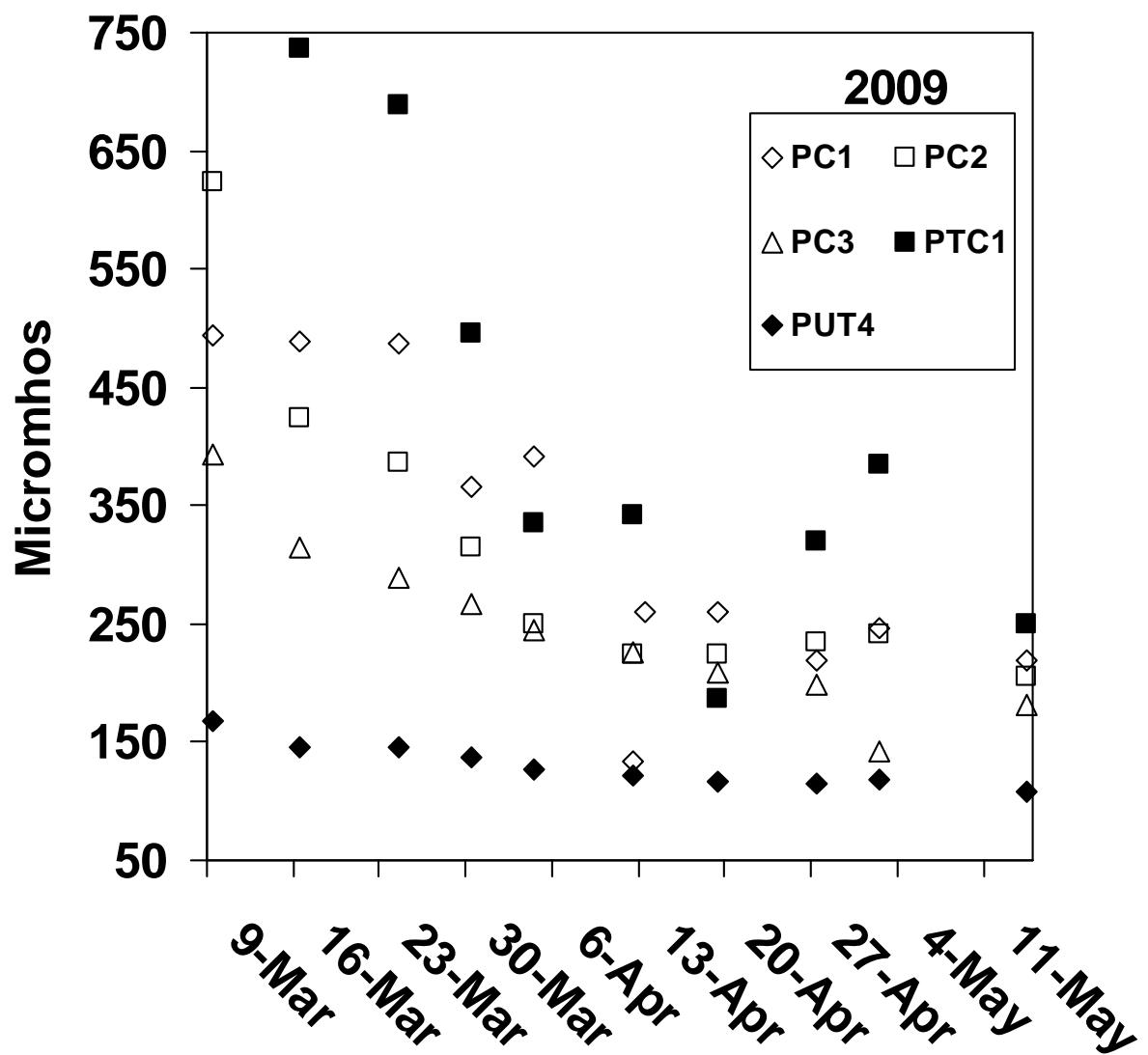


Figure 11. Historic (1970-1989; see Table 1) monthly median conductivity measurements in Mattawoman Creek (between the mouth and Waldorf,) plotted against distance from the mouth of the creek. Tidal (open squares) and non-tidal stations (open triangles) are designated. Predicted historic station medians are indicated by the line. Measurements from 2008 and 2009 stream spawning surveys and a continuous monitor at the Sweden Point Marina (March and April means) are superimposed on the plot and were not used to estimate the predicted line. The two stations furthest upstream are nearest Waldorf.

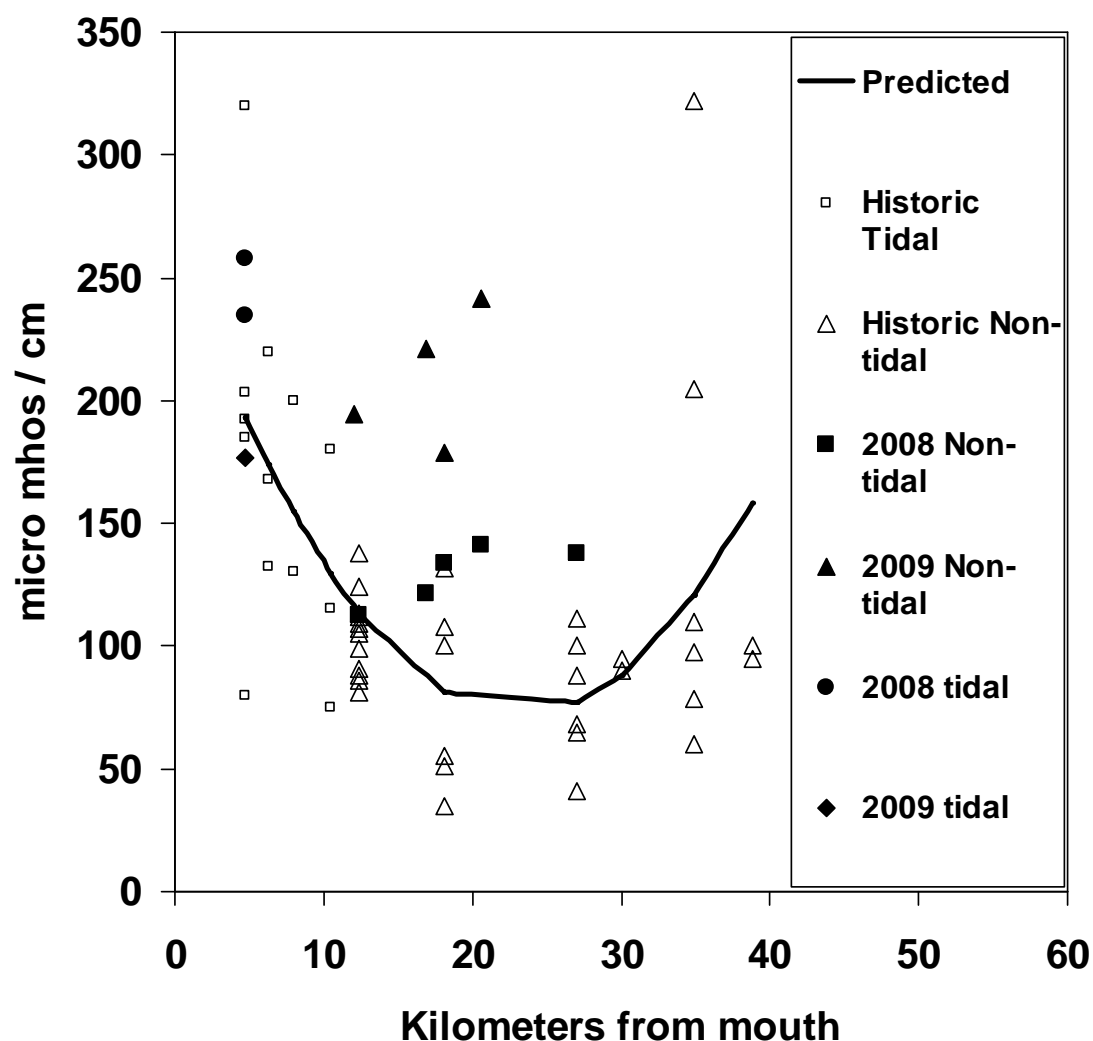


Figure 12. Sampling areas and stations for the spring yellow perch larval presence absence study.

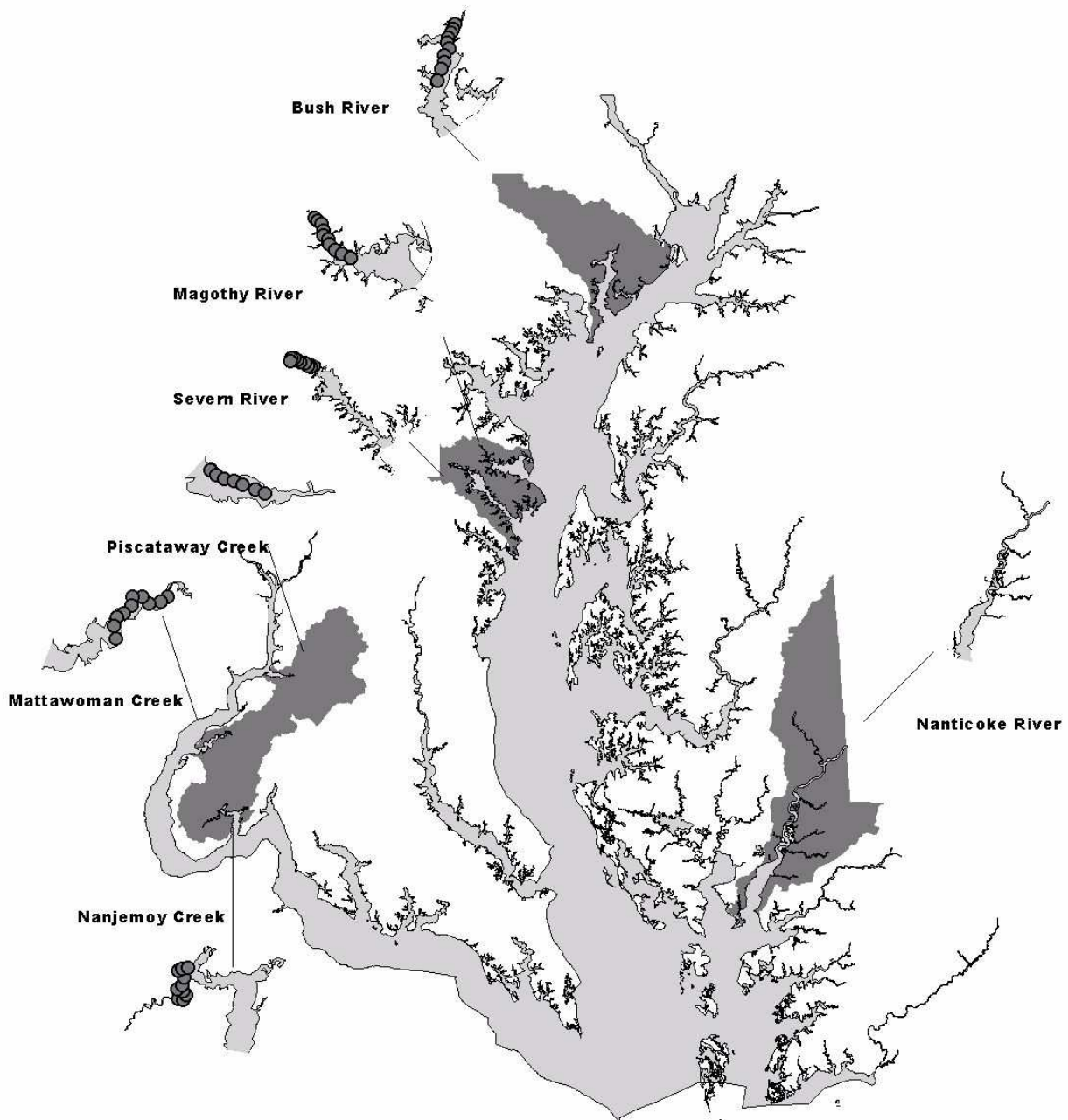


Figure 13. Proportion of tows with larval yellow perch and its 95% confidence interval in systems studied during 2009. Mean of brackish tributaries indicated by diamond and fresh-tidal mean indicated by dash. High and low points of “Historic” data indicate spread of 9 of 11 points and midpoint is the mean of historic period.

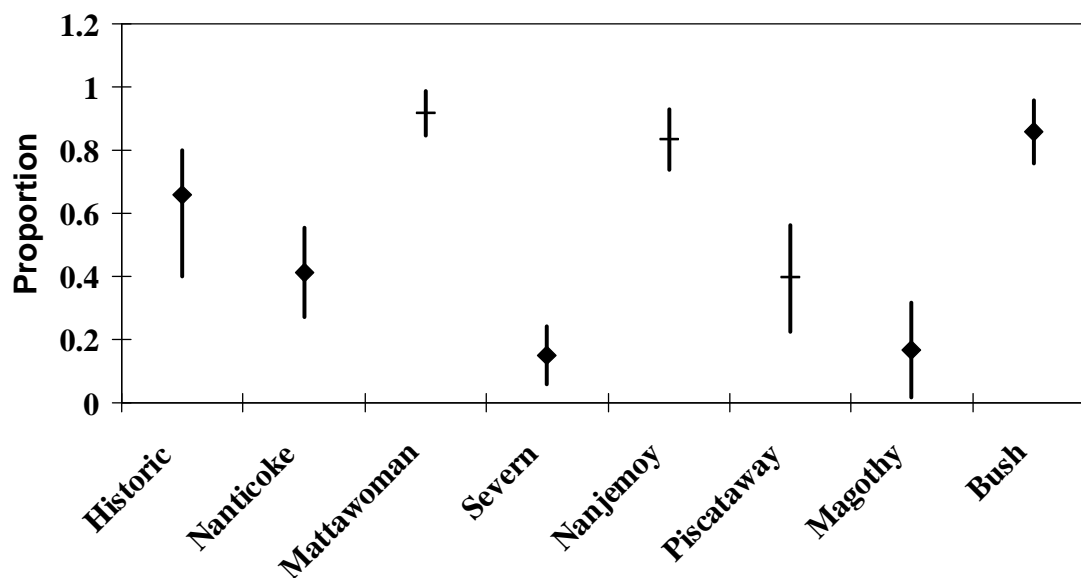


Figure 14. Proportion of tows with yellow perch larvae, by river, during 1965-2009. Dotted lines indicates reference system (Nanticoke and Choptank rivers) and period (prior to 1991) “typical” range..

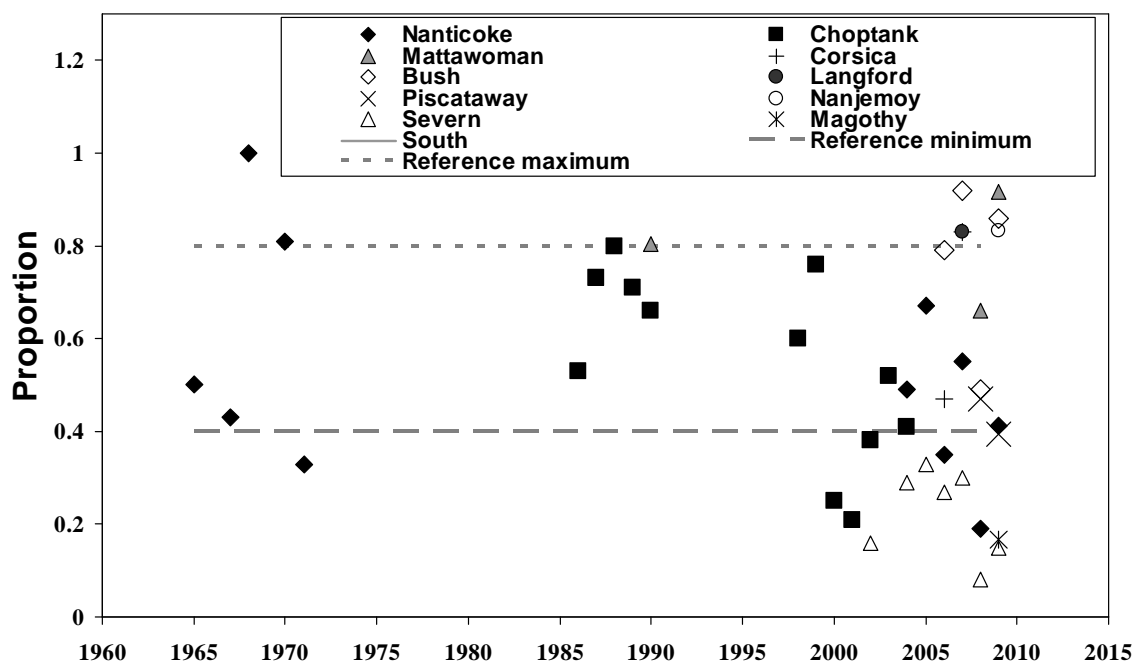


Figure 15. Impervious surface versus estuarine yellow perch larval presence-absence in towed nets 1998-2009. Salinity is treated as a categorical variable.

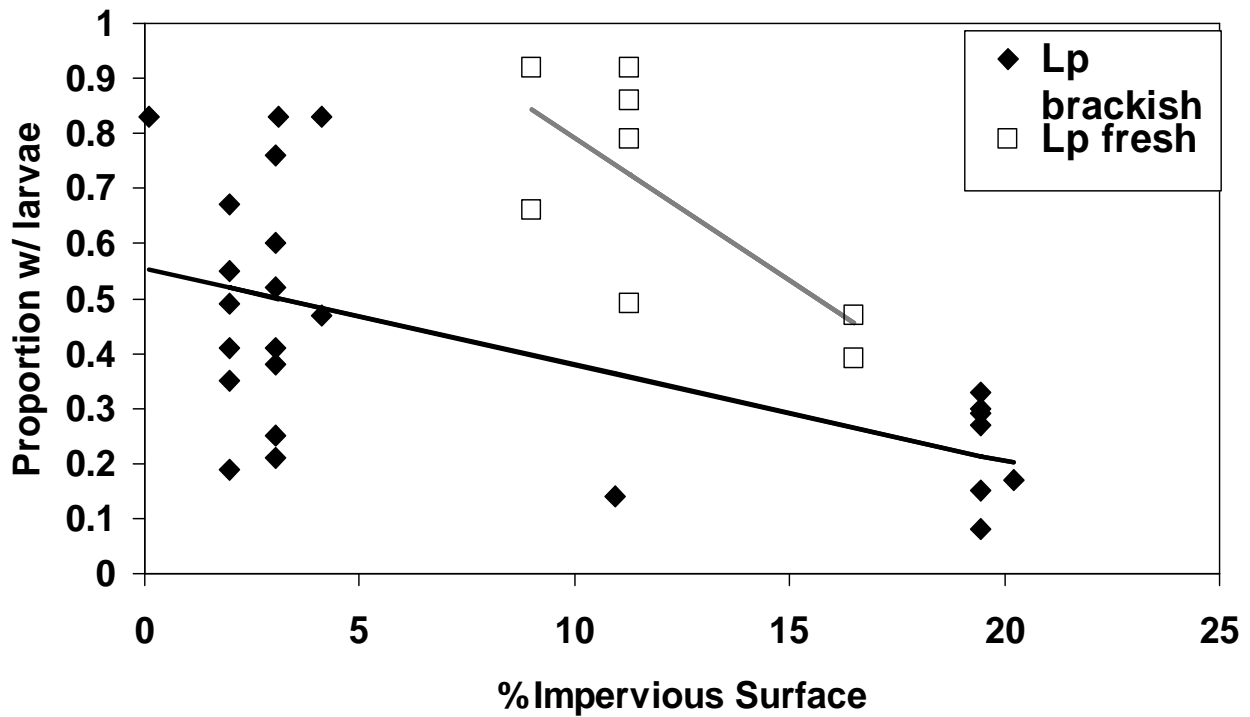


Figure 16. Number (N) of estimates of proportion of plankton tows with yellow perch larvae (Lp) falling within a category during 1965-2009. Severn, South, and Magothy rivers omitted due to suppression of Lp by factors related to impervious surface.

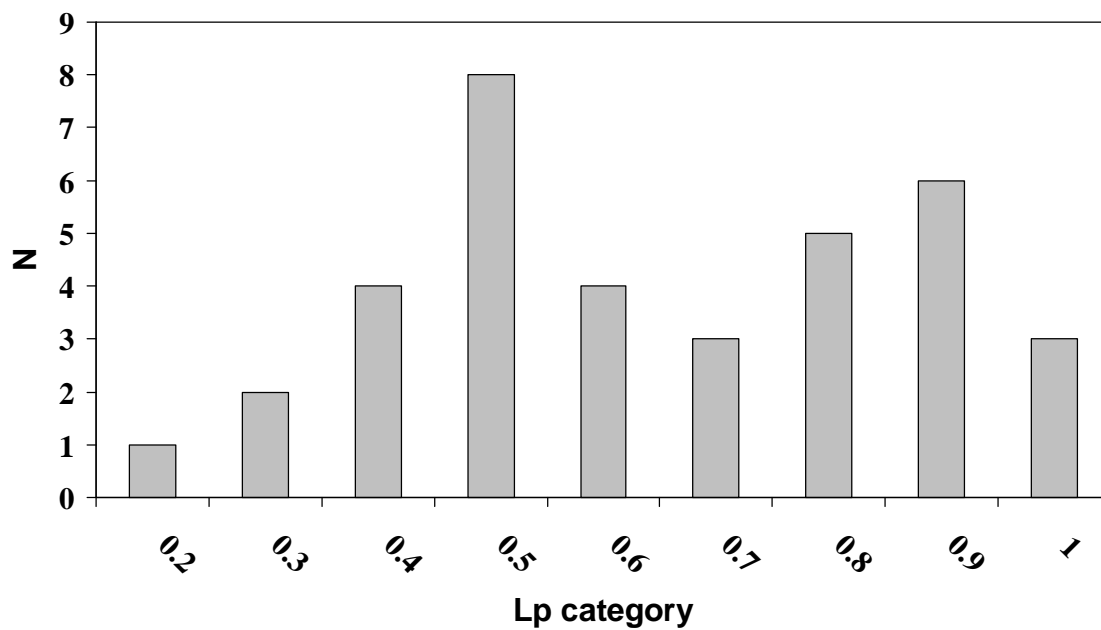


Figure 17. Rivers where seining and trawling was conducted in summer 2009. Watershed areas in Maryland indicated by dark gray shading.

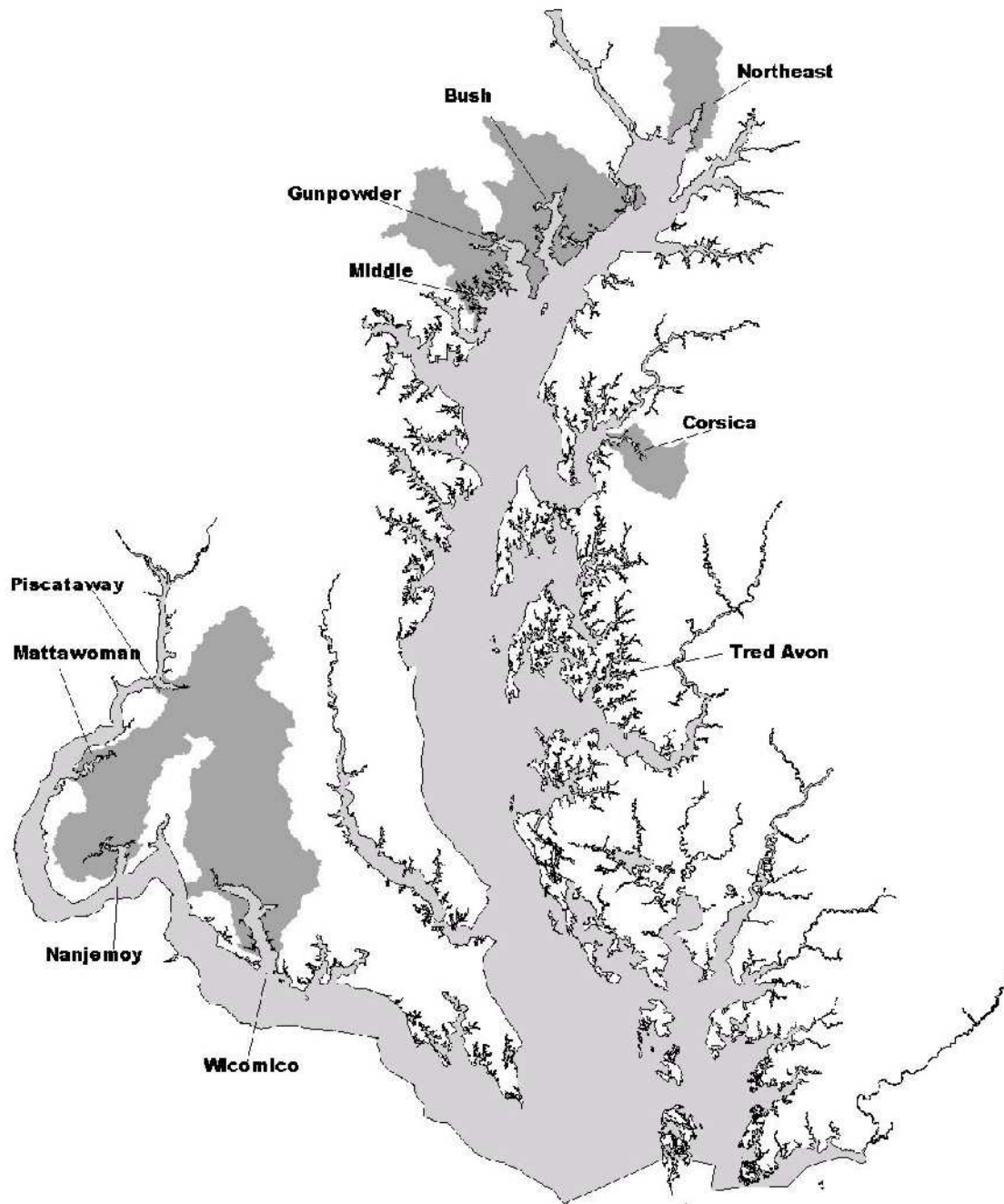


Figure 18. Land use and sampling stations in the Corsica River watershed.

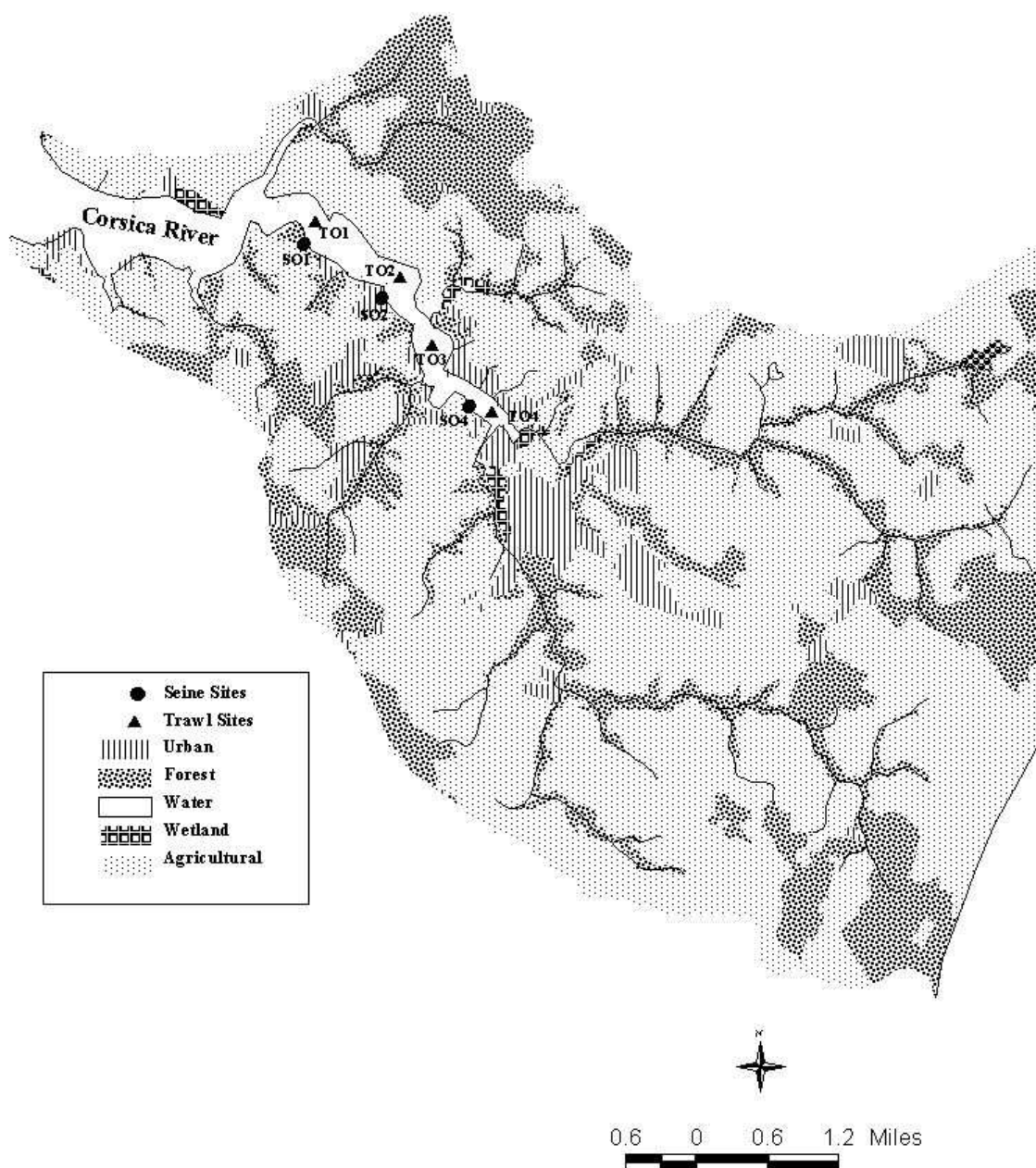


Figure 19. Land use and sampling stations in the Middle River watershed.

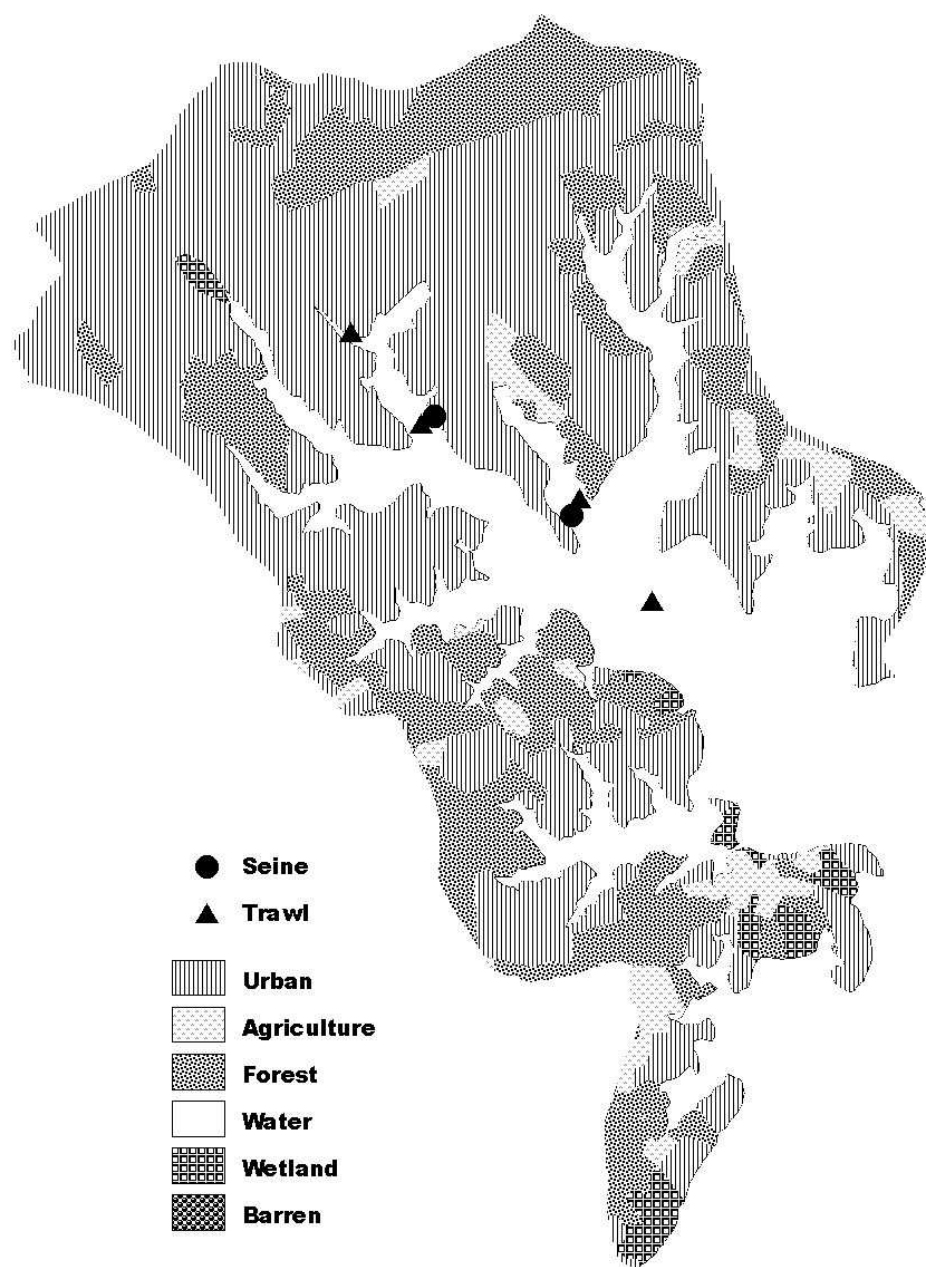


Figure 20. Land use and sampling stations in the Tred Avon watershed.

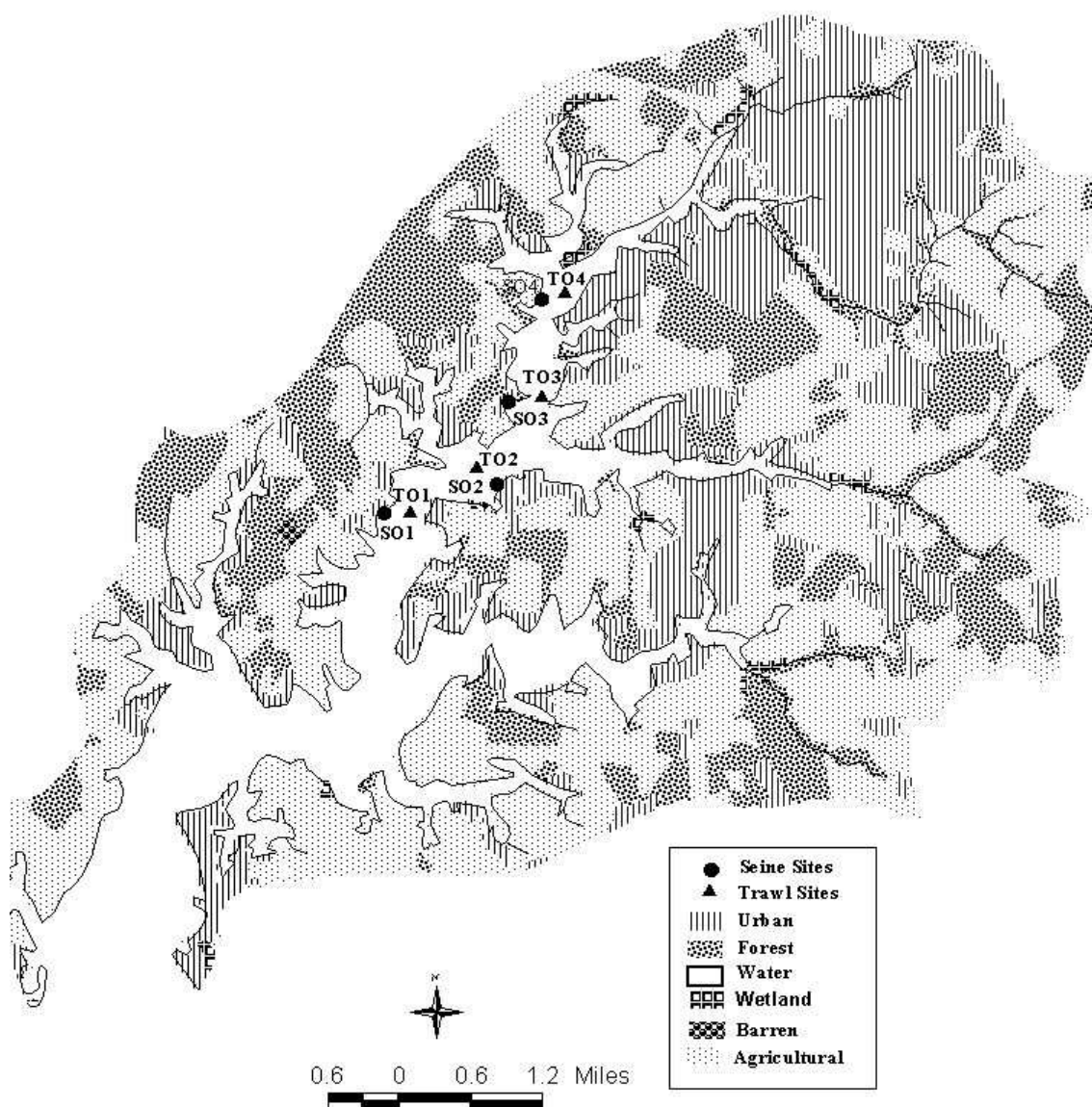


Figure 21. Land use and sampling stations in the Mattawoman Creek watershed.

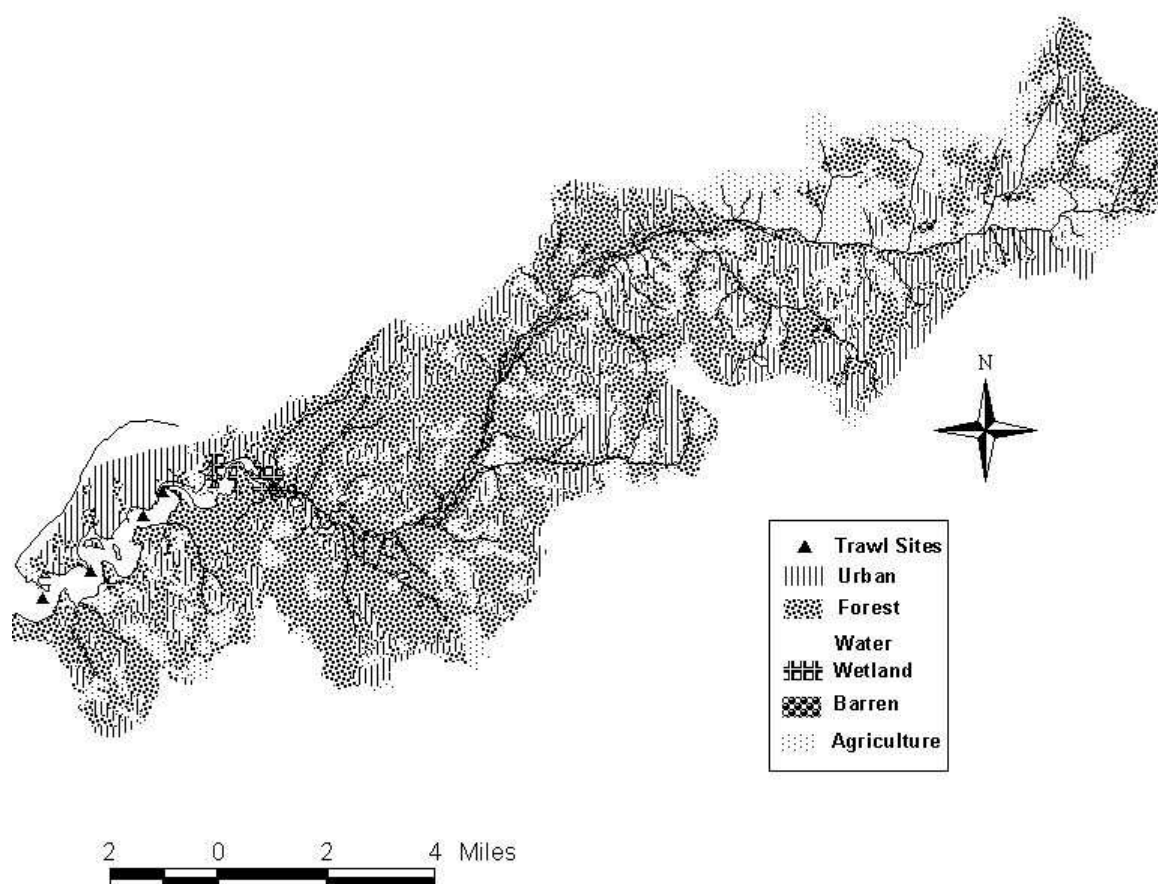


Figure 22. Land use and sampling stations in the Nanjemoy Creek watershed.

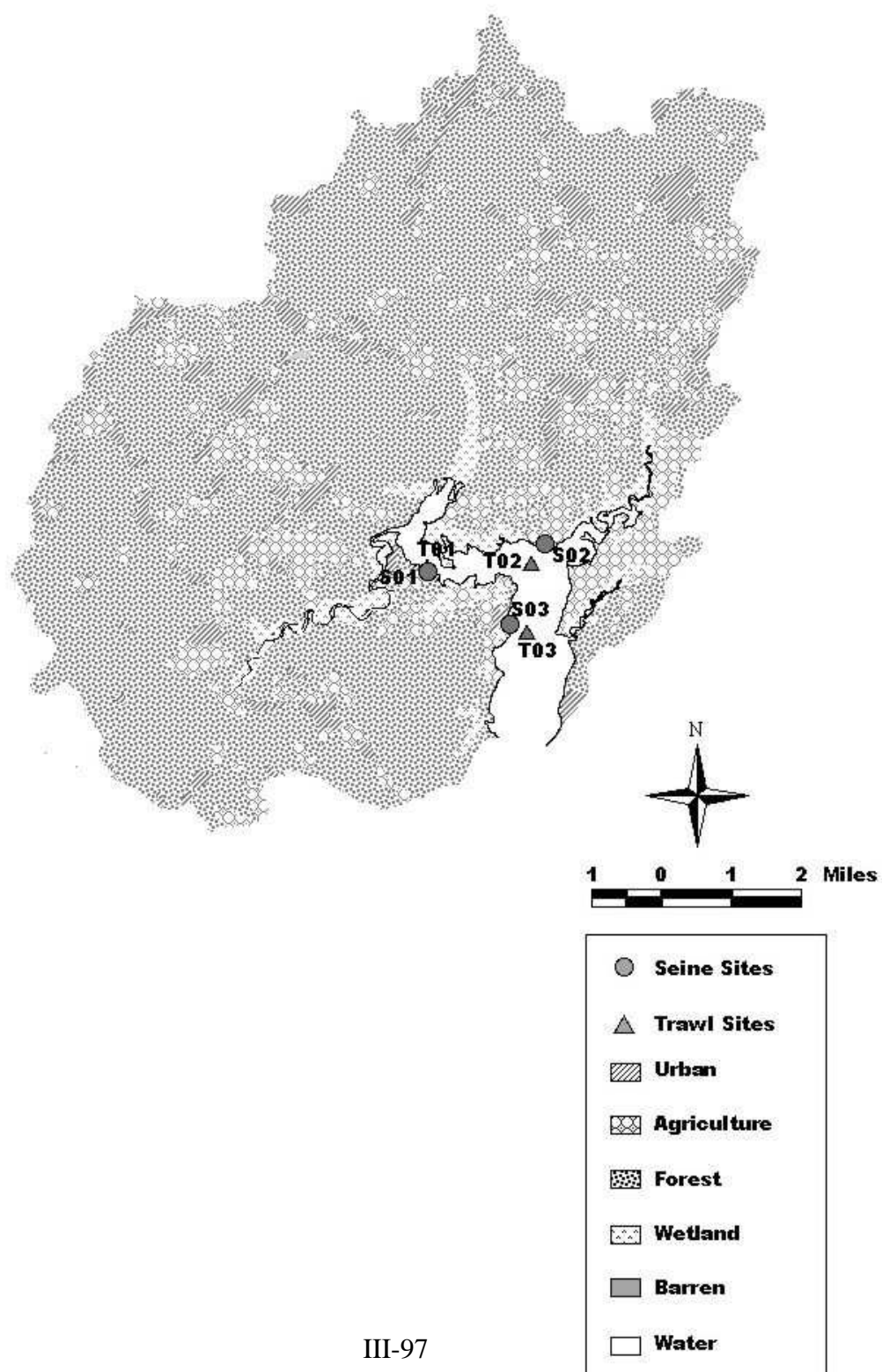


Figure 23. Land use and sampling stations in the Piscataway Creek watershed.

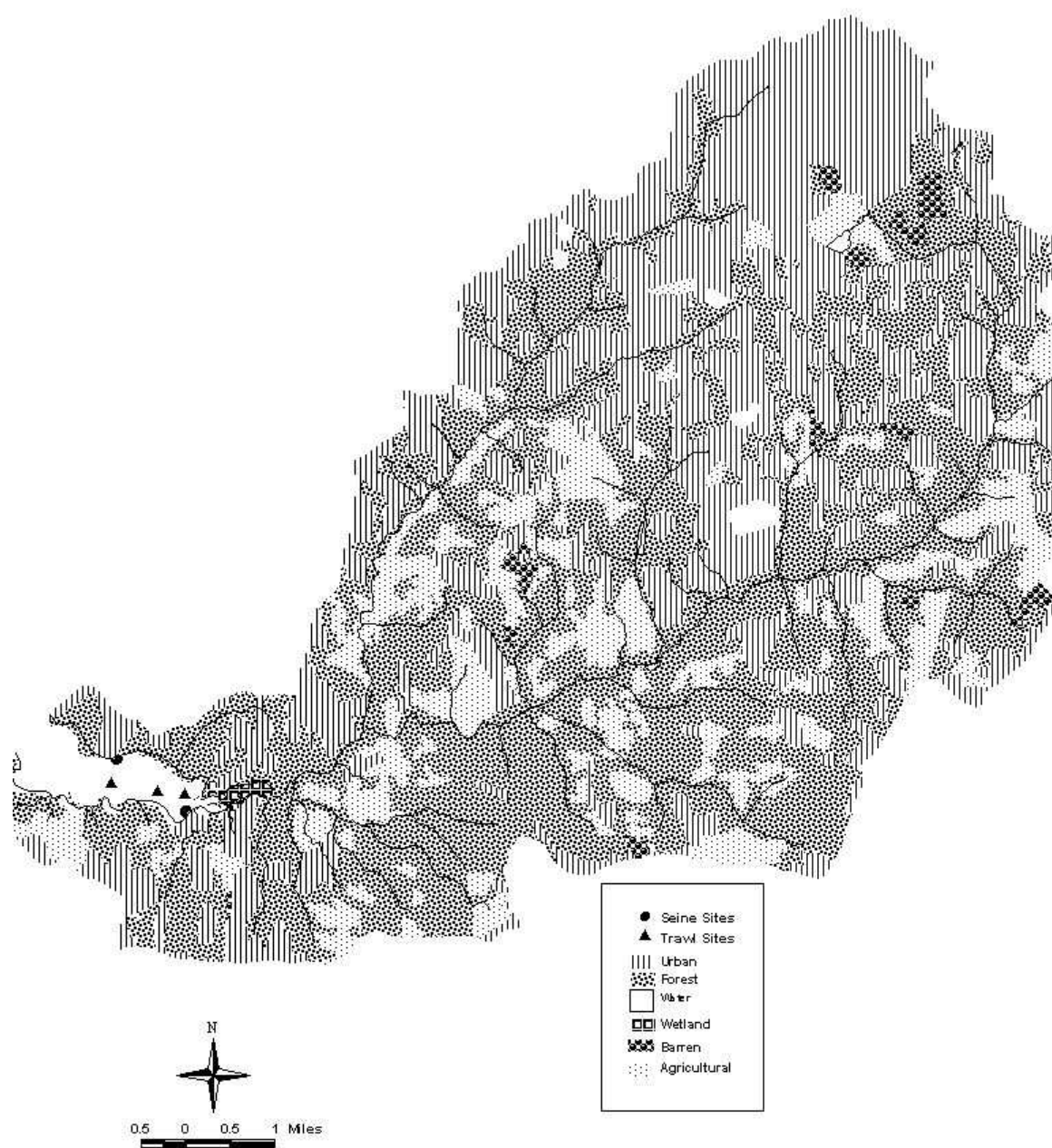


Figure 24. Land use and sampling stations in the Wicomico River watershed.

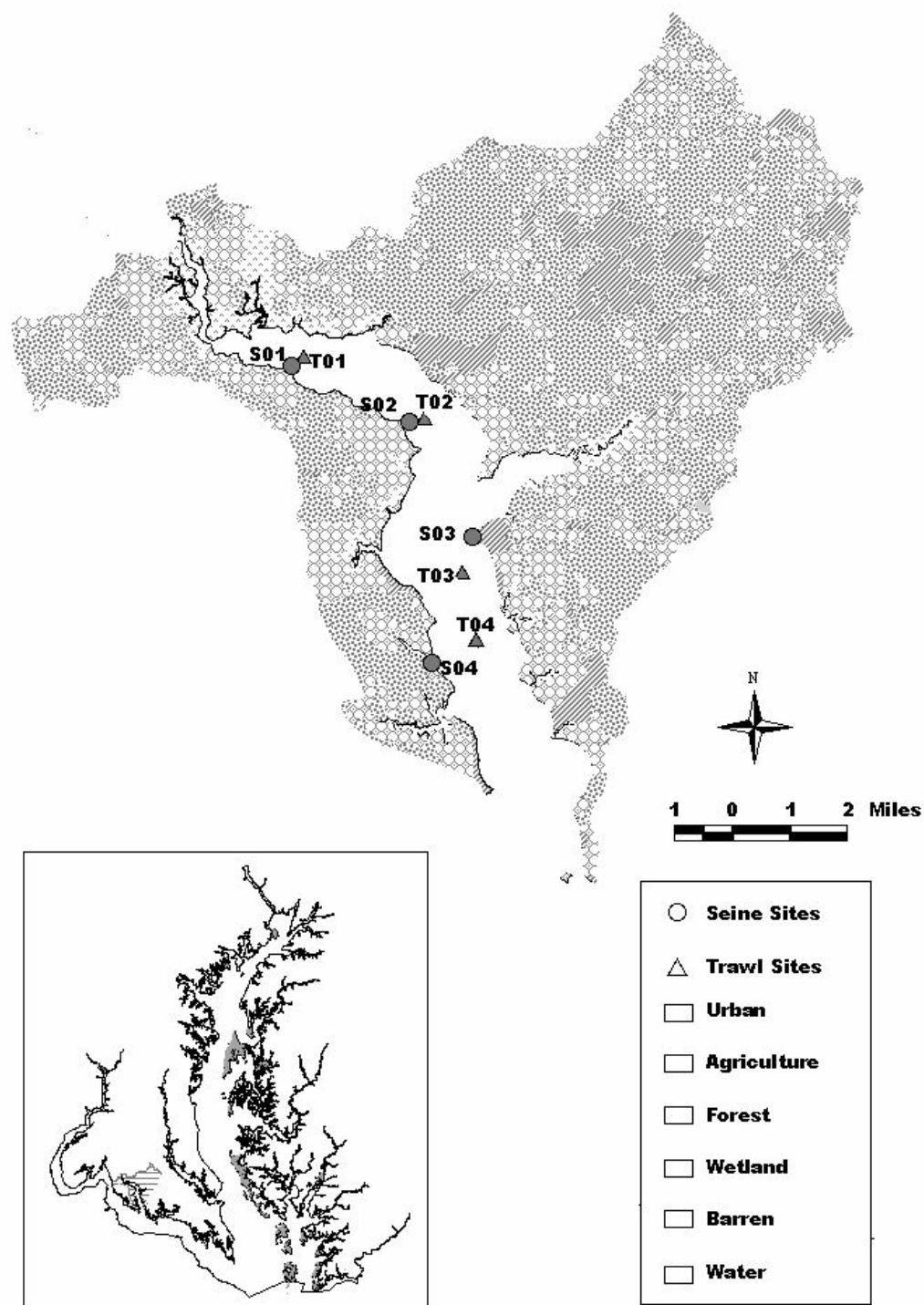


Figure 25. Land use and sampling stations in the Bush River watershed.

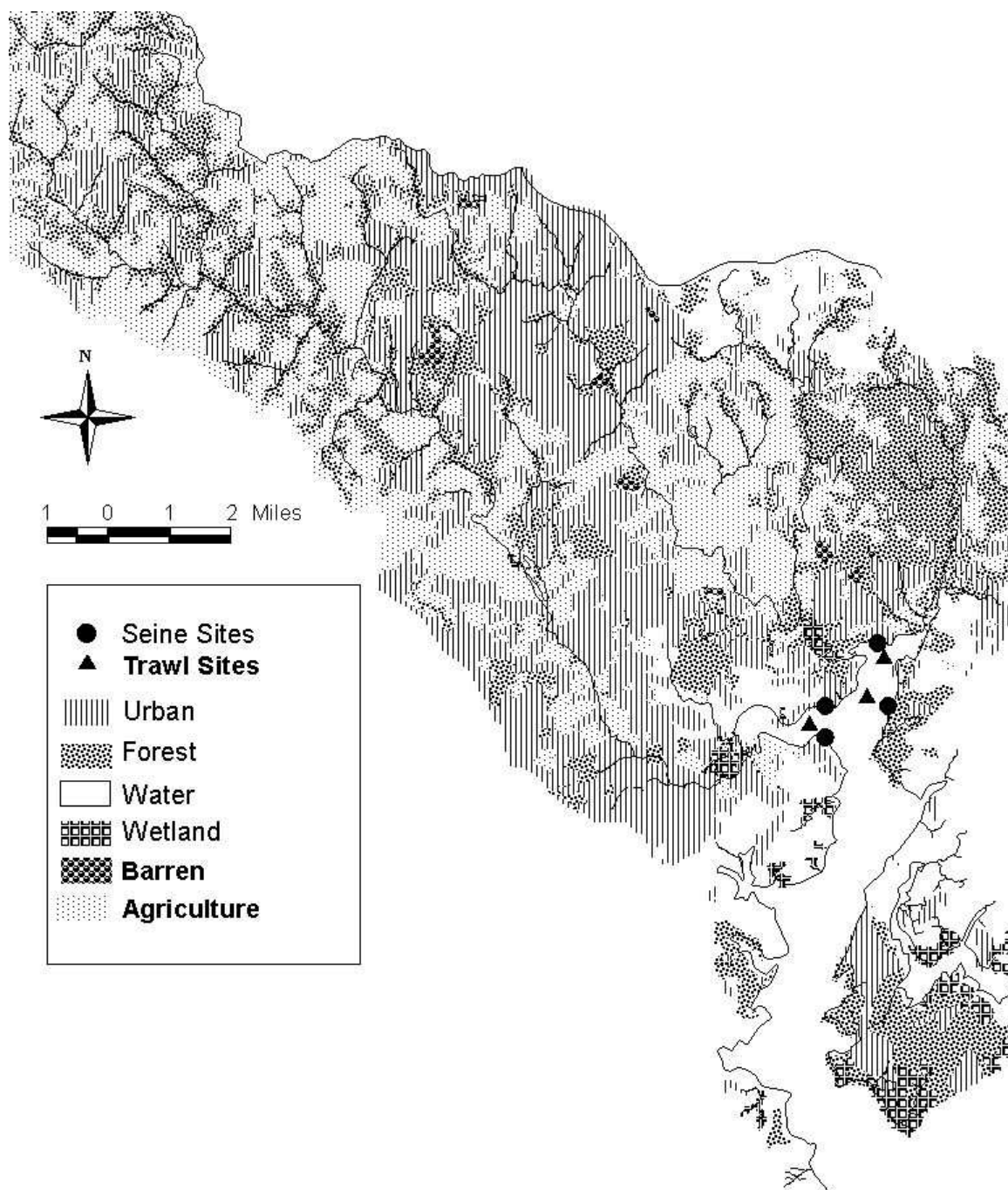


Figure 26. Land use and sampling stations in the Gunpowder River watershed.

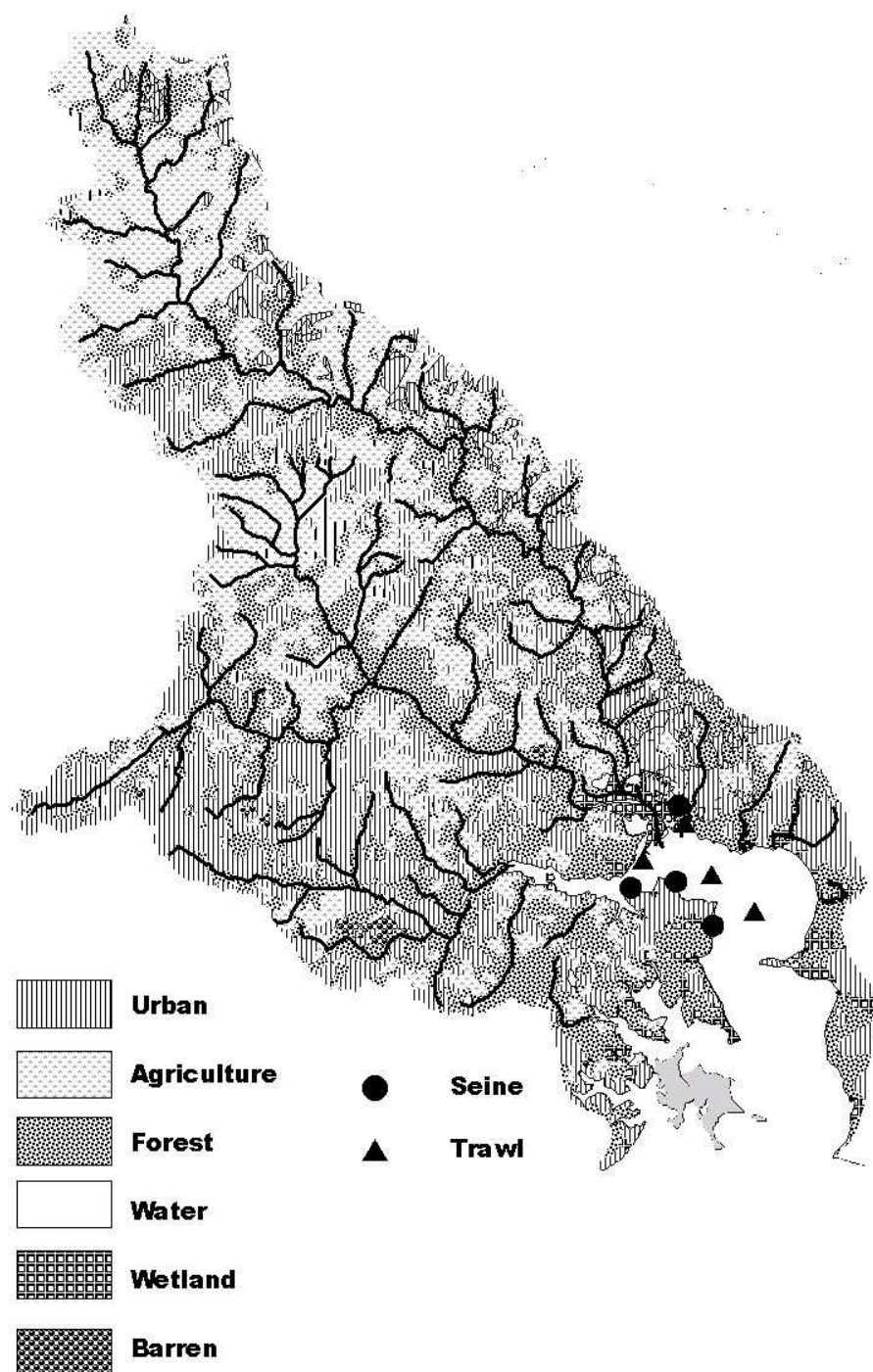


Figure 27. Land use and sampling stations in the Northeast River watershed.

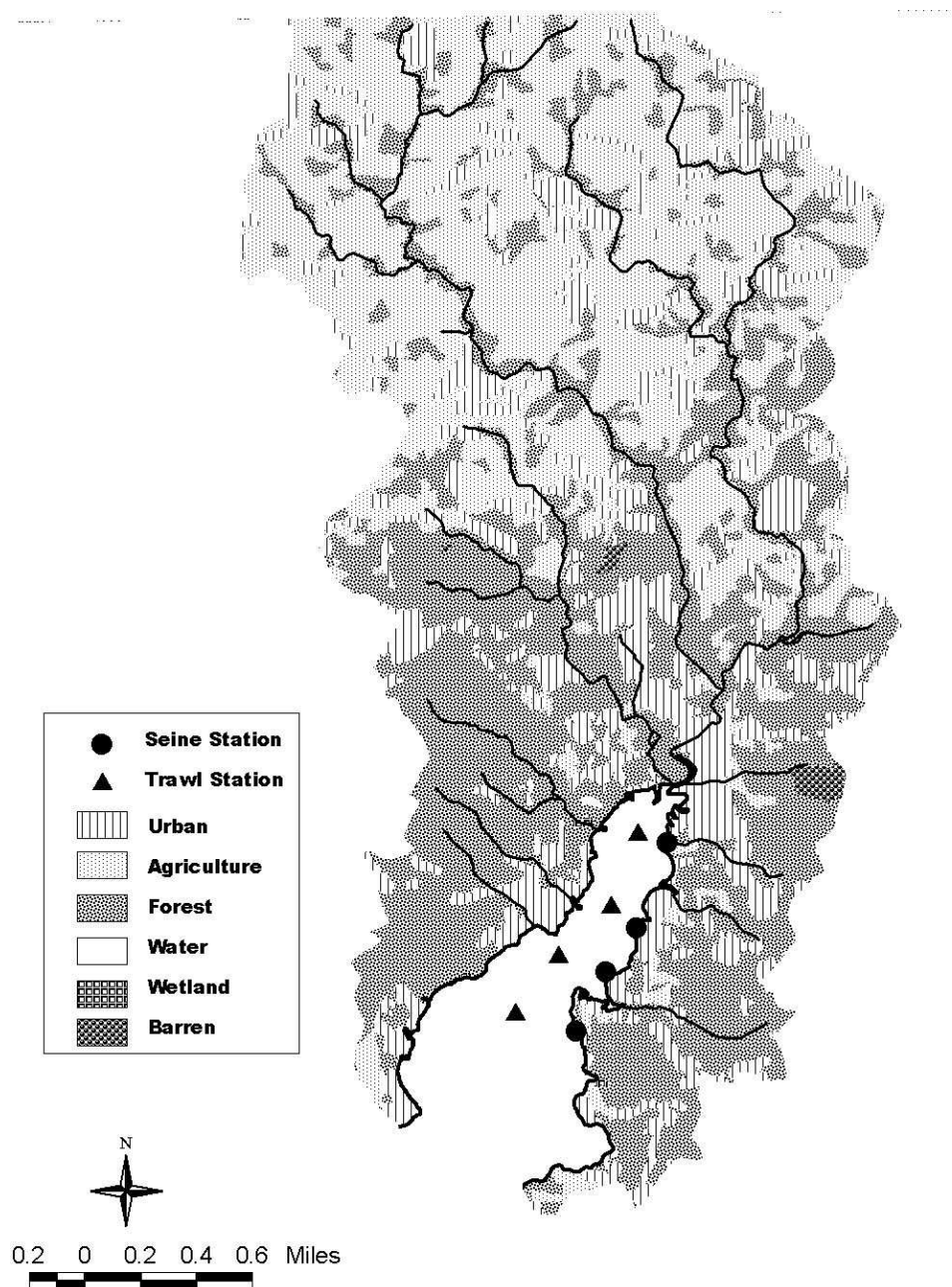


Figure 28. Trends in number of species annually captured (left Y-axis) and average  $\log_{10}$  transformed catch of all species of fish (+1; right Y-axis) in Mattawoman Creek during 1989-2009. 10 ft = trawl with 10 foot headrope and 16 ft = trawl with 16 ft headrope.

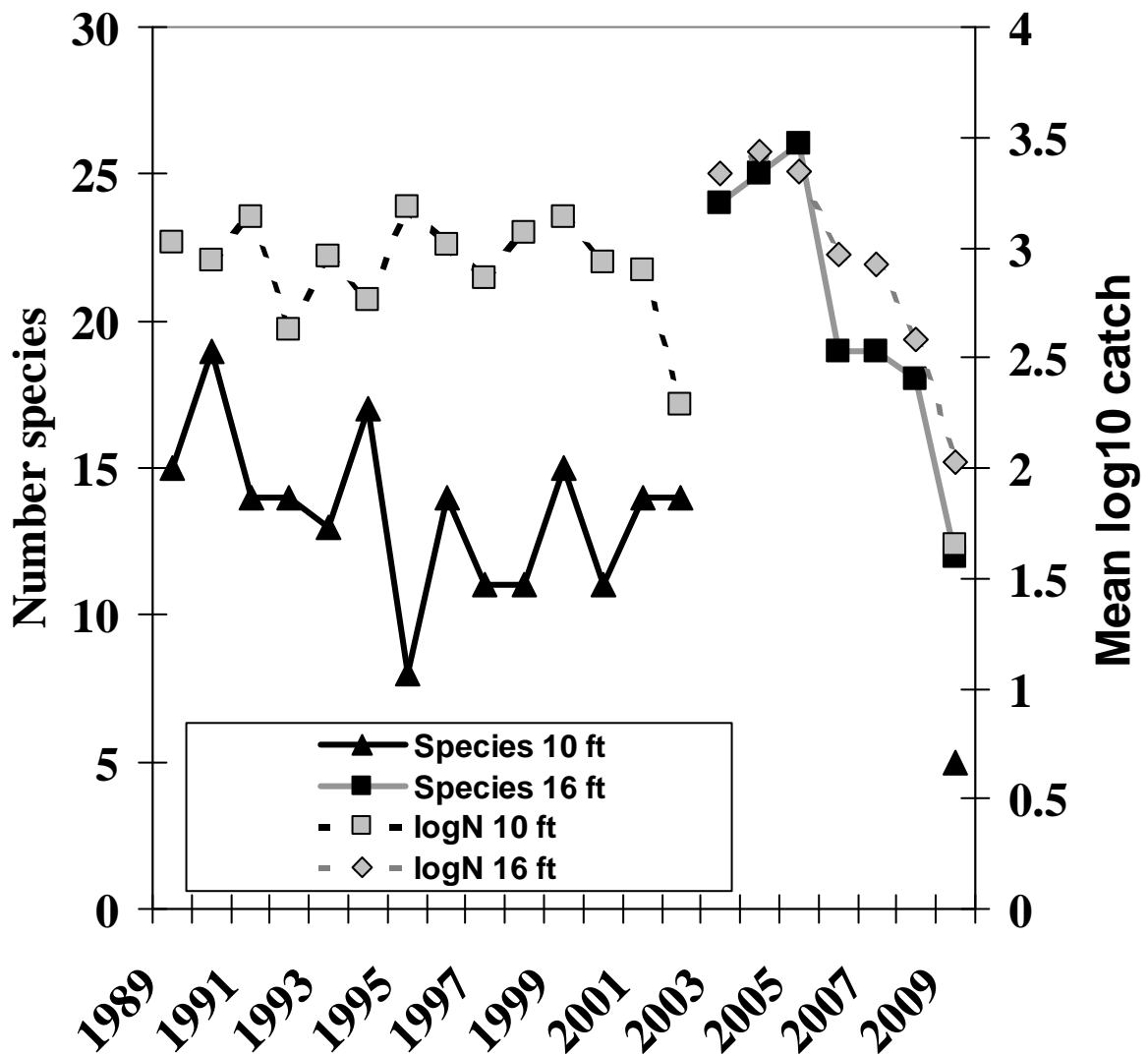


Figure 29. Log<sub>10</sub> catch per effort by station and trawl type in Mattawoman Creek, 1989 to 2009; 10 ft and 16ft trawls were used at all stations.

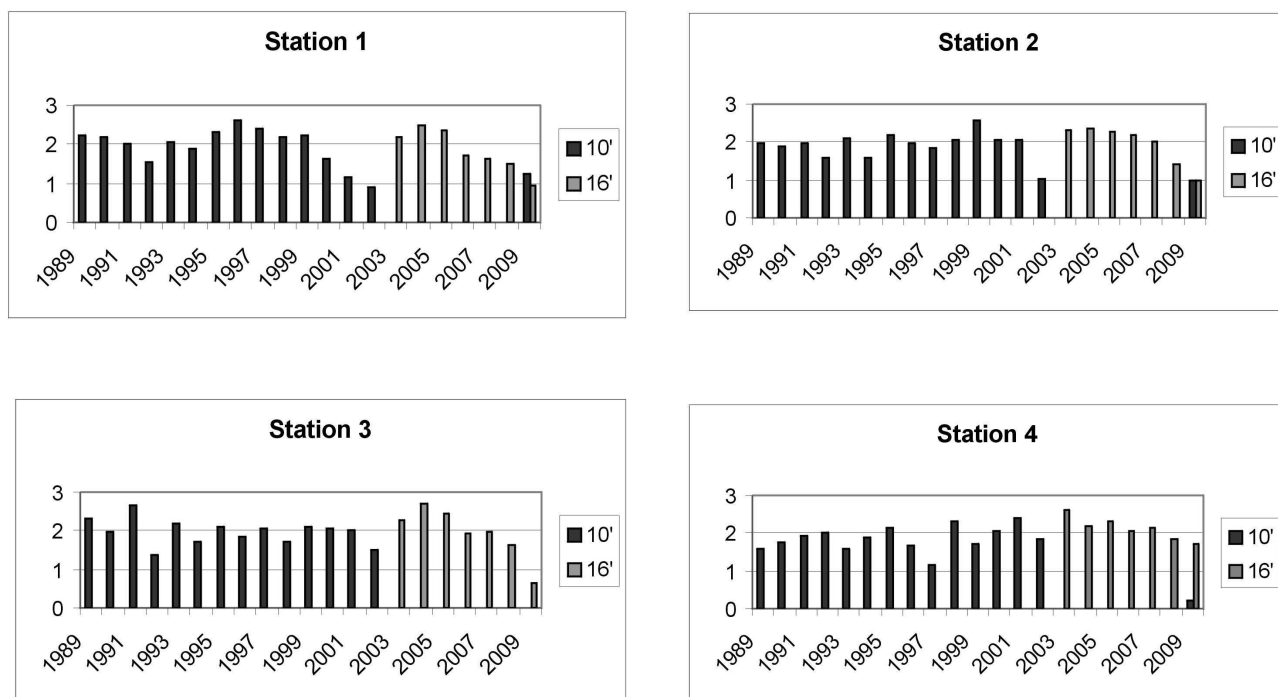


Figure 30. Striped bass sampling stations on the Upper Potomac River.

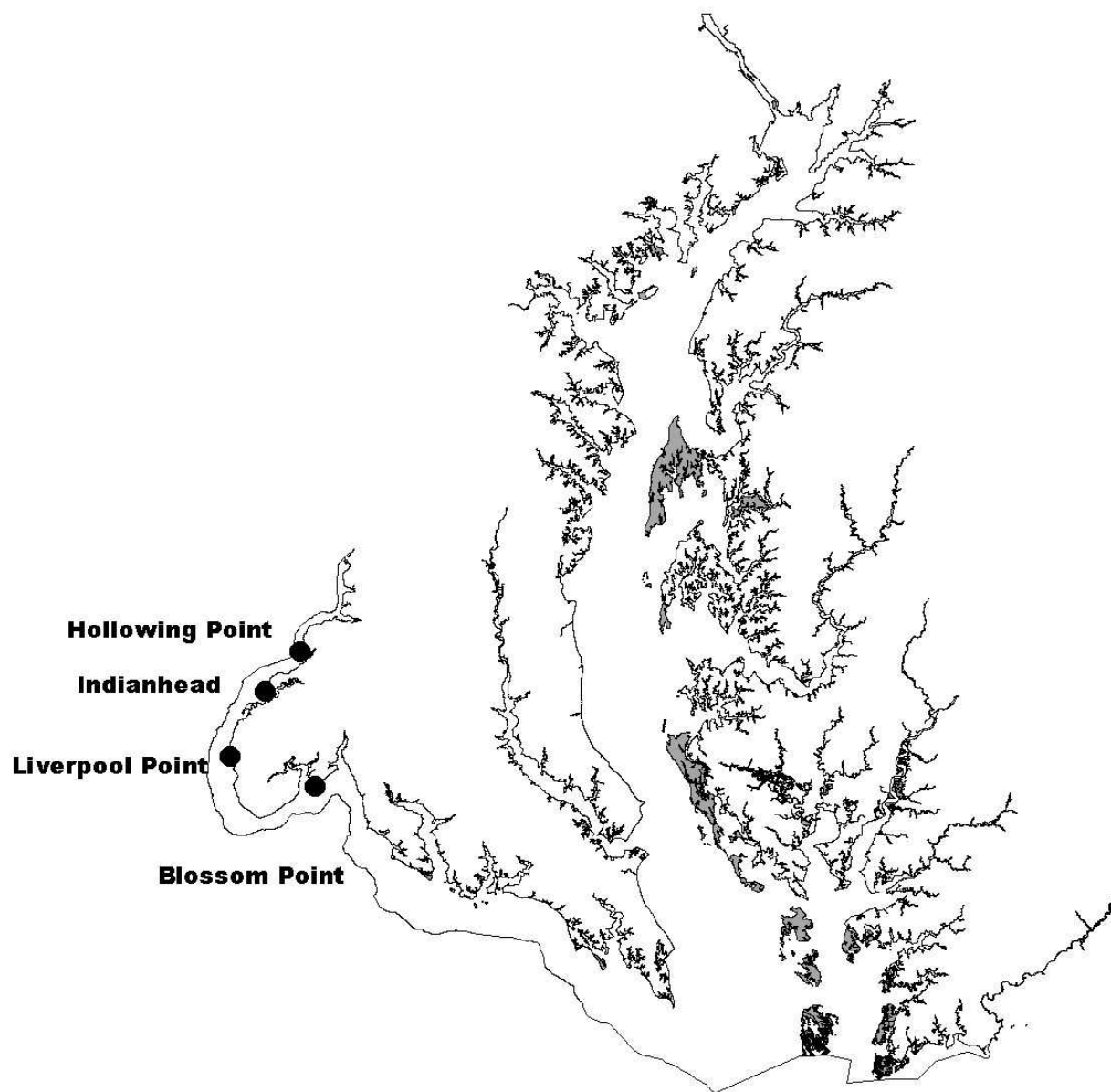


Figure 31. Species richness (number of species) by striped bass seining sites by year from 1989 to 2009. (Data provided by Eric Durell.)

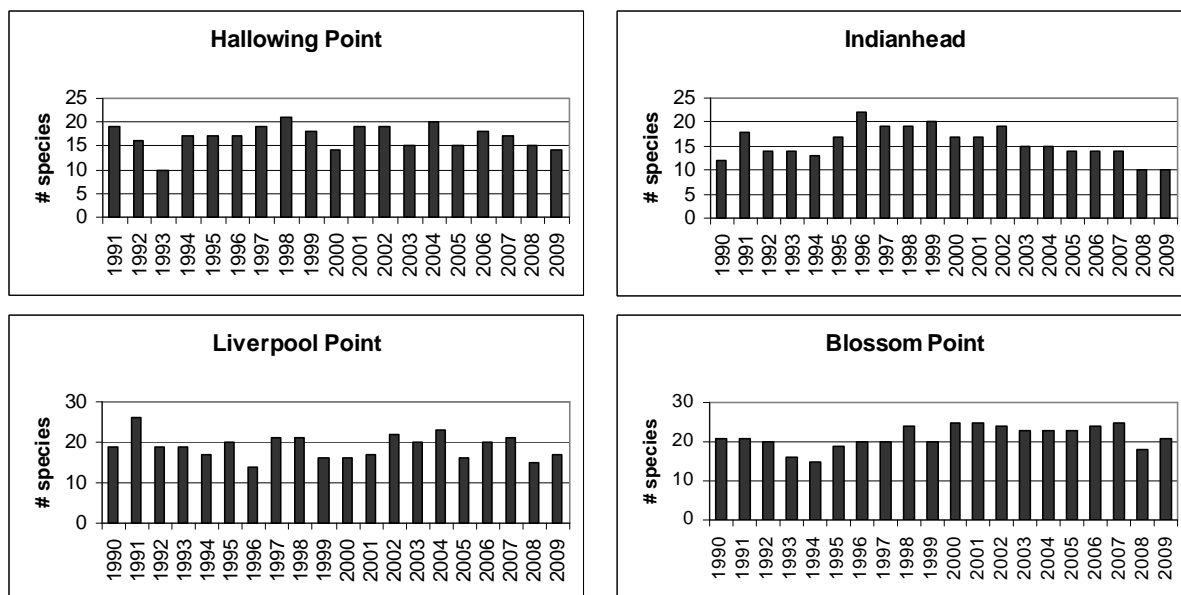


Figure 32. Species comprising 90% of the catch at striped bass seining sites from 1989 to 2009. (Data provided by Eric Durell.)

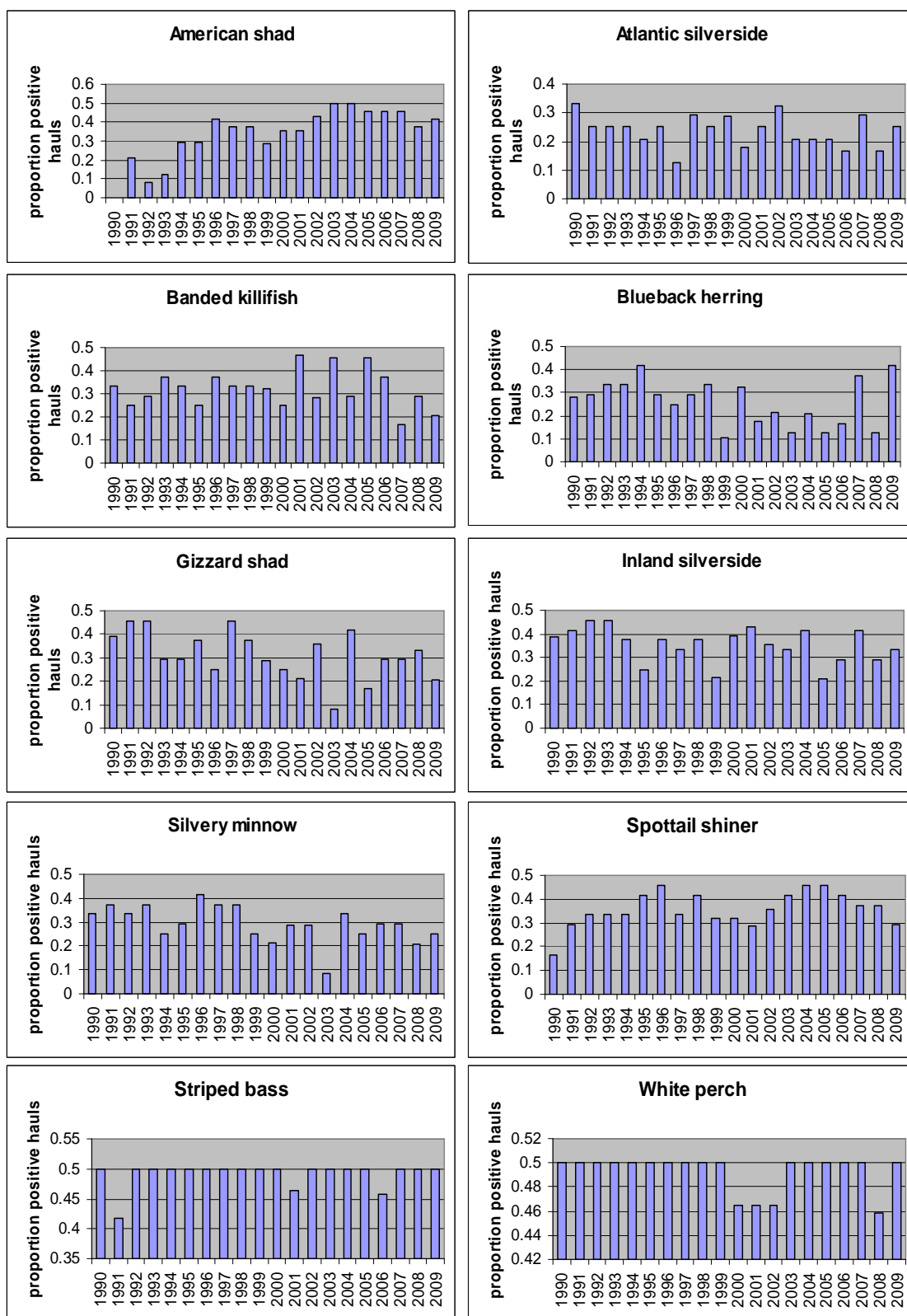


Figure 33. Observed and predicted number of species and mean log10-transformed catch (+1) plotted against number of structures built in Mattawoman Creek's watershed from 1989-2008. A 10 ft trawl (squares) was used to sample during 1989-2002 and a 16 ft trawl (diamonds) was used from 2003-2008. Species = number of species and P Species = predicted number of species. Log10 N = mean log10-transformed catch (+1). P Log10 N = predicted mean log10-transformed catch (+1).

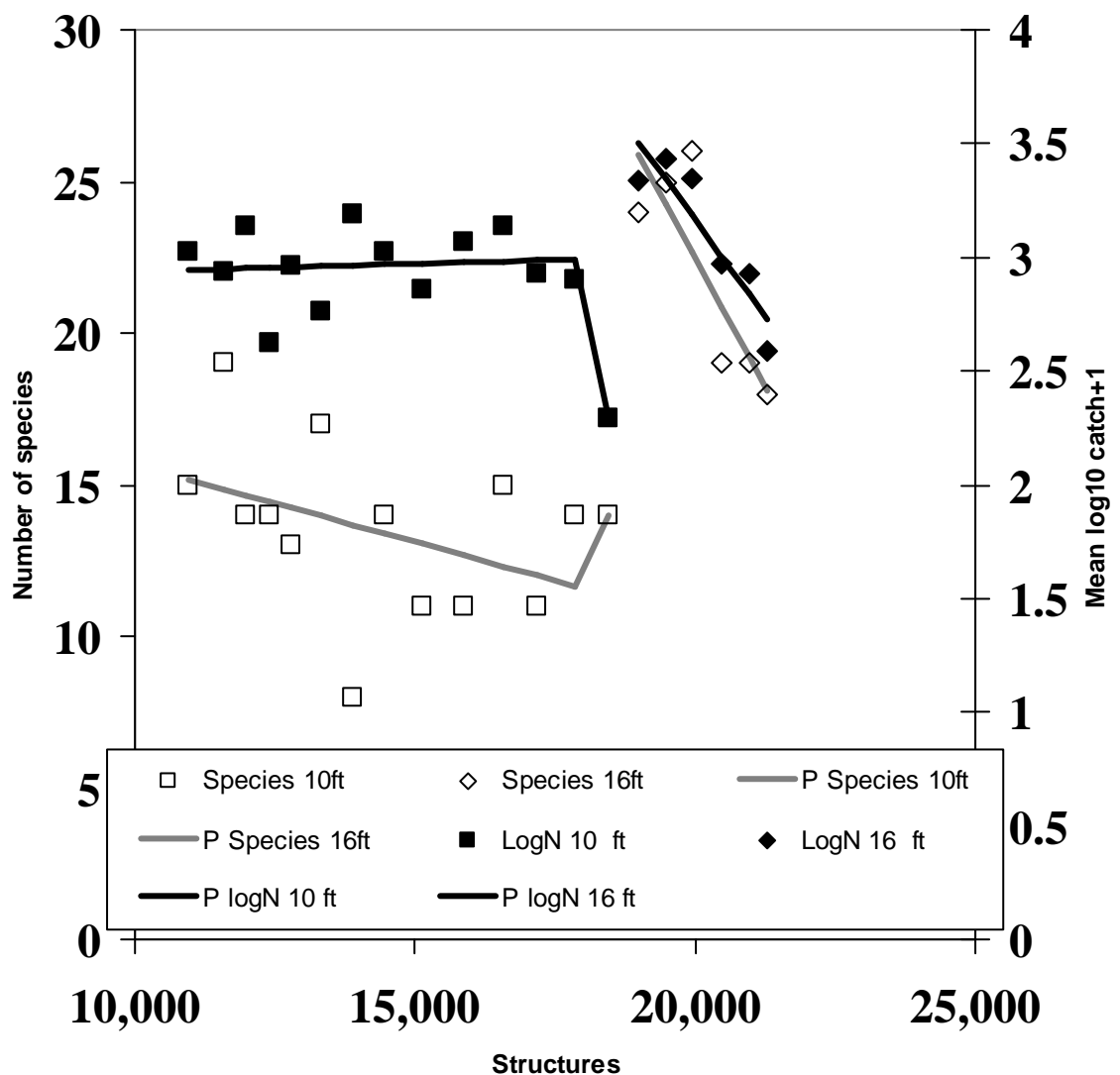


Figure 34. Box and whisker plot of bottom dissolved oxygen in Mattawoman Creek from 1989 to 2009. (Dark bar is the median, gray box represents the upper 75th percentile and the lower 25th percentile, black bars indicate the upper 95th and lower 5th percentiles, dark boxes indicate outliers.)

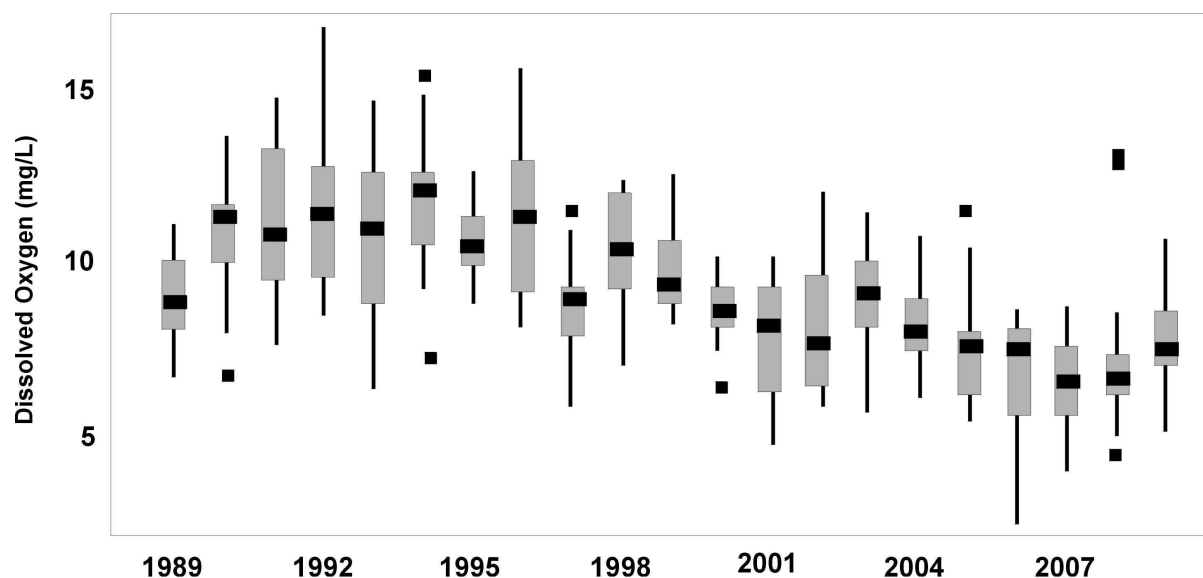


Figure 35. Proportion of violations of 3.0 and 5.0 mg/L criteria in the Corsica River.

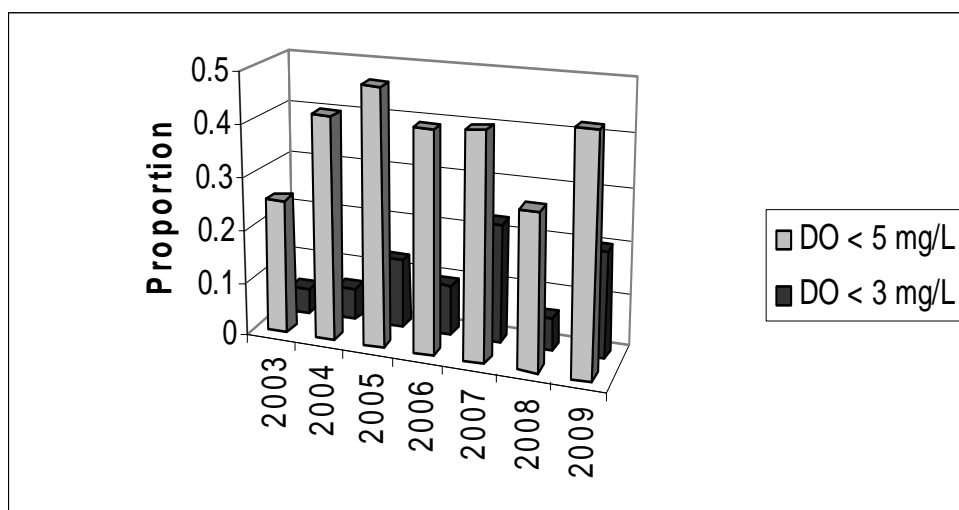


Figure 36. Proportion of temperature violations in Corsica River.

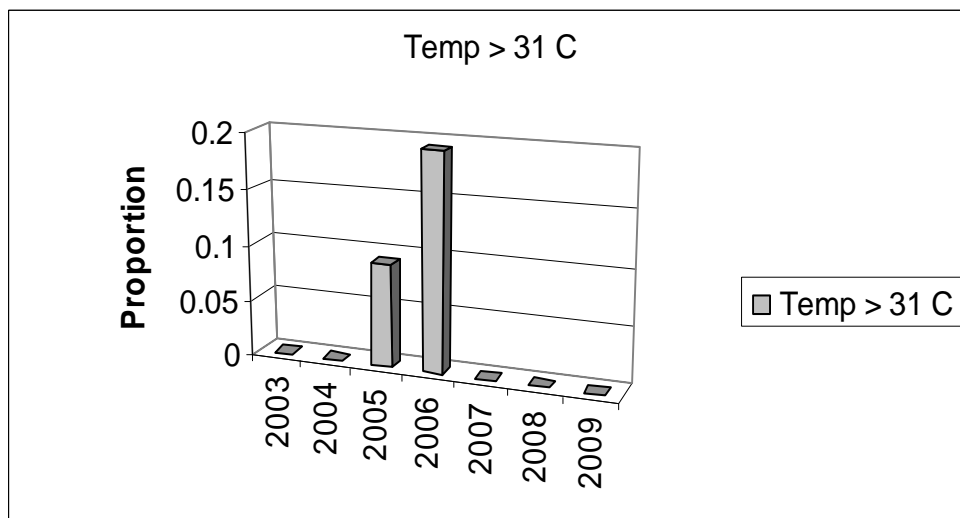


Figure 37. Number of species by year and gear type in the Corsica River.

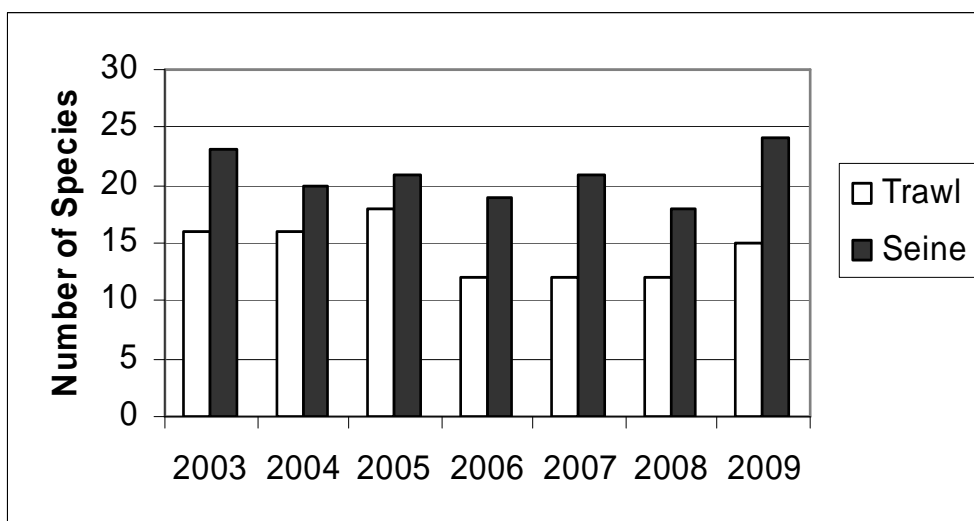


Figure 38. Number of species in the seine in Wicomico River, 1989-2009.

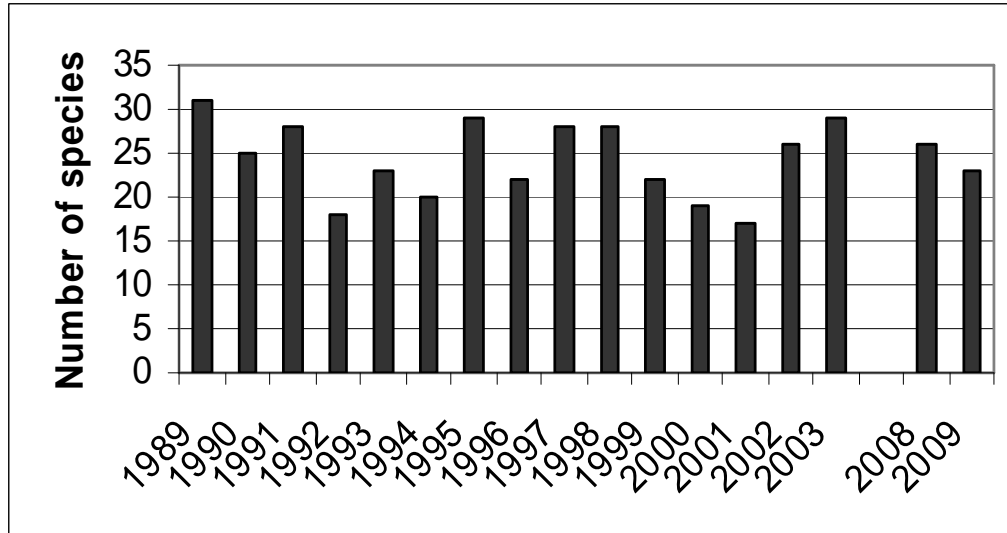


Figure 39. Number of species in the trawl in Wicomico River, 1989-2009. Note: We shifted from a small (10' trawl) to a large (16' trawl) in 2003.

